

Government
Publications

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GOVERNMENT ACTIVITIES IN THE NORTH

1965

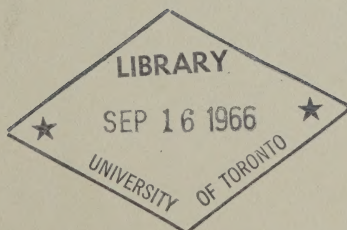


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GOVERNMENT ACTIVITIES IN THE NORTH

- 1965 - 1

Advisory Committee on Northern Development
Department of Northern Affairs and National Resources
Ottawa, Ontario

July, 1966



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ADVISORY COMMITTEE ON NORTHERN DEVELOPMENT

Responsibilities To advise the government on questions of policy relating to civilian and military undertakings in northern Canada and to provide for the effective co-ordination of all government activities in that area.

Review of 1965 Operations

Reports were made to the Committee on a variety of matters affecting government policy in the north. Following the recommendation of the Committee, the Minister of Northern Affairs appointed a Commission of Enquiry to consider political development in the N.W.T.

The Construction Subcommittee allocated field responsibilities for the 1965 government construction program.

The Telecommunications Subcommittee arranged the consolidation of all government northern telecommunication requirements through a new Planning Division of Department of Transport.

A Ground Effects Machine Subcommittee was formed to examine the potential use of hovercraft in the north. As a result, arrangements were made to conduct field trials of a SRN-5 hovercraft at Tuktoyaktuk in April-May, 1966.

The membership of the Advisory Committee on Northern Development was:

The Deputy Minister of Northern Affairs and National Resources
(Chairman)

The Secretary of the Cabinet

The Undersecretary of State for External Affairs

Deputy Minister of Transport

Deputy Minister of Finance

Deputy Minister of Mines and Technical Surveys

Chairman, Canadian Section, Permanent Joint Board on Defence

The Chairman, Chief of Staff

The Commissioner, Royal Canadian Mounted Police

President, National Research Council
Deputy Minister of Public Works
Deputy Minister of Citizenship and Immigration
Deputy Minister of National Health
Deputy Minister of Defence Production
Deputy Minister of Agriculture
Deputy Minister of Fisheries
Chairman, Defence Research Board
The Secretary, Advisory Committee on Northern Development

DEPARTMENT OF AGRICULTURE

Responsibilities To investigate the agriculture potential in Northern Canada; through research determine the possibilities of gardening and farming; advise other government agencies on matters related to agriculture in the Yukon and Northwest Territories, and other unsettled areas of the North; conduct botanical and ecological surveys as required; study the biology, distribution and systematics of northern insects, plant diseases, and soils.

Long-term Plans

Continue agricultural research on the Experimental Farms at Fort Vermilion, Fort Simpson, Inuvik, and Mile 1019; continue appraisal of agricultural potential in the North on the basis of soil surveys and surveys of native vegetation; collect insects, fungi, and plants; study agro-climatic relationships on a continuous basis at most centres; provide agricultural data for an overall study of the natural resources of the North.

Review of 1965 Operations

Major organizational changes were made for the purpose of closer integration of research work in the North. Program direction and administration was centralized at the Experimental Farm, Beaverlodge, Alta. for the following establishments: Prince George for Northern British Columbia; Mile 1019, Alaska Highway for the Yukon; Fort Simpson and Inuvik for N.W.T.; and Fort Vermilion for Northern Alberta.

Experimental work was continued on field and garden crops, beef cattle, and poultry at Mile 1019, Alaska Highway. Experiments included the production of cereal and forage crops under various rotations and fertilizers, and the production of certain vegetables and flowers using plastic shelters and mulches. Crops of tomatoes, corn, peppers, beans, celery, etc., were grown successfully to maturity under cheaply constructed crop shelters. Tests were continued with various forages and carrying capacity studies of native and seeded pastures. Work was in progress to determine the feed consumption of beef cattle during the winter months in cattle barns and open feed lots constructed for this purpose.

At Fort Simpson experiments were continued with field and garden crops in relation to climatic and soil conditions on the alluvial soil on the island and also on the brown and grey-wooded soils on the mainland along the Liard River.

Experiments with garden crops at Inuvik were suspended for one year in order to better prepare the test area and to revise the program of work.

At False River, near Fort Chimo, work was continued on the alluvial soils over perma-frost. Some vegetables were again grown successfully in plastic-covered greenhouses, cold frames, and crop shelters, under plastic mulches, and in the open garden. Again cereals failed to mature although the yields of green forage from cereals appeared a possibility. Sufficient agricultural data have been collected in this area during the past ten years to provide a sound basis for recommendations so the substation was formally closed at the end of this season. A detailed report is now in preparation.

The Slave River Lowland area was examined as to its agricultural potential, particularly for grazing. The survey team was composed of a soil specialist, a grazing expert and a botanist working in consultation with an agronomist and forestry management personnel. A detailed report is now in preparation on this survey.

A botanist and an entomologist worked on Melville Island in the Arctic Archipelago, doing general collecting and obtaining material for ecological studies of plants and insects. Papers were published on the plants from the Mackenzie District, including the Reindeer Grazing Preserve. Also on the basis of entomological work at Lake Hazen Camp six papers were published in 1965 bringing the total to 21 papers in the series entitled "Studies on Arctic Insects".

Plans for 1966

Agricultural research work will be continued at Mile 1019, Fort Simpson, Inuvik, and Fort Vermilion. Emphasis will be placed on the agro-climatic aspects considering climate, plants and soils at various centres.

A party of four entomologists will continue ecological studies at Hazen Camp. In collaboration with a group of workers from the University of Alberta a study will be begun on the inter-relationships between flowers and insects.

A second party of entomologists will join a group of Danish scientists in Peary Land, north Greenland. This will enable our scientists to fill in an important distributional gap in information on the origin of species in the Canadian high arctic refugium.

One botanist will work in the southern Yukon and eastern Alaska collecting herbarium material from the Cordilleran region.

AIR TRANSPORT BOARD

Responsibilities The licensing of air carriers to operate commercial air services; the economic regulation of air carriers; investigations and surveys relating to the operation and development of commercial air services in Canada and advising the Minister of Transport on matters relating to civil aviation.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

The fixed wing airlift requirement for the vertical resupply of the DEWLine ex Winnipeg and Churchill for the period July 1, 1965 to June 30, 1966 was awarded by MATS, USAF, to TransAir Ltd. of Winnipeg, and the fixed wing airlift requirement for the lateral resupply of the DEWLine for the same period was awarded to Nordair Ltd., Dorval, P.Q. The Board approved both contracts. The air transportation requirements of the USAF for the ADC (Gap-Pine) sites in Labrador and on Resolution Island, N.W.T., for the period July 1, 1965 to June 30, 1966 are being provided under contracts with MATS and in accordance with filed tariffs, by Wheeler Airlines (1960) Ltd., Okanagan Helicopters Ltd., Eastern Provincial Airways (1963) Ltd. and Newfoundland Air Transport Ltd. Supervision and coordination of these contractual arrangements continue and liaison has also been provided re Mid Canada Line requirements.

The Board has continued to deal with applications for additional air service in the North and to provide information on their availability.

Plans for 1966

Normal planning to meet responsibilities.

CANADIAN BROADCASTING CORPORATION

Responsibilities To provide a radio broadcasting service to the people of the North and to broadcast programs about the North on its radio and television networks.

Long-term Plans

To extend the medium wave service to new communities where this is feasible, to improve it by providing more programs in the local Indian and Eskimo languages and to extend and improve the shortwave service in English, French and Eskimo.

Review of 1965 Operations

In January, Radio Station CHFC Churchill moved into new studios. An improved transmitting antenna and ground system was installed for better local coverage. In November, the Mackenzie Network, with program centre at Yellowknife, was extended by means of CNT landlines to Fort Simpson where an LPRT (low power relay transmitter) was established. Construction of new studios and offices for CFWH Whitehorse was started in September for early 1966 occupancy. LPRTs were established at Schefferville and Gagnon in order to provide an outlet for both the French and English radio networks. The network service to the LPRTs at Labrador City/Wabush was also changed to provide this bilingual service.

The CBC undertook to provide French and English recorded television programs to the stations established by the Iron Ore Company at Labrador City and Schefferville.

The Northern Service gave special coverage to the summer and winter sessions of both the Yukon and Northwest Territories Councils. It cooperated with the Advisory Commission on the Development of Government in the Northwest Territories in its tour of the North by broadcasting, prior to the tour, talks by members of the Commission on its purpose, details of its itinerary and an invitation to the people of the North to meet the members of the Commission. During the tour, reports of its meetings and unavoidable changes in its itinerary were broadcast in English, French, Eastern and Western Eskimo, Loucheux, Dogrib and Slave, on shortwave and on the medium wave community stations.

Coverage was also given to the Ottawa sittings of the Commission and to the two-day special meeting in November of the Northwest Territories Council to discuss its submission to the Commission.

The weekly program "Indian Magazine" expanded its coverage to Northern Ontario, becoming available to approximately 75,000 Indians living there.

A series of short talks "North of '60" by Mr. Wilf Brown, Chief of the Territorial Division, Northern Administration Branch, Department of Northern Affairs and former Deputy Commissioner of the Northwest Territories, explained the operation and administration of the Territories.

A daily program "Arctic Patrol" was broadcast on shortwave during the summer with the cooperation of the Marine Division, Department of Transport, for crews of Government and other ships plying in northern waters during the navigation season. Families and friends of the ships' companies were invited to use the program to send messages and greetings. The itineraries of the vessels, their daily position and an account of their activities were included in the program.

At the close of the navigation season, "Arctic Patrol" became a daily edition of "Northern Messenger" which, for the past 33 years, had been a weekly winter program. In future, it will be prepared daily throughout the year in Montreal by the Northern Service.

The Northern Service cooperated with the Indian-Eskimo Association in a feasibility study of a community development project in Northern Canada, using radio among other means of communication. The Centennial Commission provided a grant of \$6,000 for the study. As a result of this study, it was decided to send the first project officer to Inuvik with the financial cooperation of Government departments concerned with the North, the Northwest Territories Council, the CBC and the Indian-Eskimo Association.

In the report of the Committee on Broadcasting (the Fowler Committee) published in September, the following observation was made on the Northern Service:

"For a total operating cost of \$1.2 million in 1964-65, the Northern Service is making an excellent contribution to the development of the Canadian North and the well-being of its residents..." (p. 194)

It recommended improvement and expansion of the Service and its programs at an estimated increased operating cost of \$500,000.

Plans for 1966

The Community Development Project will be expanded. Following the initial undertaking in the Mackenzie Delta, a similar project will be launched in Frobisher Bay. The results of these two undertakings will provide the information and experience needed to expand the project to other places.

The program "Indian Magazine", dealing with matters of interest and concern to Indians throughout Canada on and off the reserves, will be broadcast on the National English Network of the CBC.

The Mackenzie Network will be extended to Norman Wells and Pine Point.

New studios and offices will be provided at Goose Bay.

Radio Station CFWH Whitehorse, program centre for the Yukon Network, will move to larger and better quarters.

CENTRAL MORTGAGE AND HOUSING CORPORATION

Responsibilities	Design of housing, preparation of town development plans, and drafting of planning legislation as requested from time to time by the Department of Northern Affairs and National Resources. Financing of housing under the terms of the National Housing Act.
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Long-term Plans

The facilities of the National Housing Act and the services of the Corporation will be made available wherever and whenever it is required.

Review of 1965 Operations

Lending Activities

Housing units financed in the North under the National Housing Act totalled 105. This was considerably more than the 1964 total of 12. Of these, 6 were in the Yukon and 99 in the Northwest Territories. The 99 units in the N.W.T. included two rental projects of 23 units each. One was constructed at Fort Smith and the other at Hay River. The borrower in each case has an agreement to rent all the units to employees of the Department of Public Works on a bulk lease.

The second mortgage plan provided by the Governments of the Northwest Territories and the Yukon Territory as an addition to amounts available under the National Housing Act, continued in operation. The plan is administered by Central Mortgage and Housing Corporation on behalf of the Territorial Governments. Only two such loans were made during 1965, one in the Yukon and the other in the Northwest Territories. This brings the total number since the inception of the programme in 1962 to 38.

Other Activities

In March, the Corporation reviewed proposals for a new commercial centre in Pine Point, N.W.T. and submitted drawings and a model of the revised scheme to the Department of Northern Affairs and National Resources.

In July, the Corporation completed a study for the Department of Northern Affairs and National Resources on architectural and planning controls for the National Parks. This involved the operation of development control procedures in accordance with overall plans.

The Ontario Research Foundation, on behalf of the Corporation, continued the research and field test programme in connection with the development of a self-contained sewage disposal system suitable for the single family dwelling. Two types have been developed and are now being tested in various localities. One type handles all the waste from a family dwelling and is known as the flow-through type and requires normal effluent disposal in a reduced size tile bed. The other type is known as the closed circuit unit which is aimed at problems encountered in areas of permafrost and difficult terrain and in areas of water shortage. The closed circuit unit re-uses the effluent for flushing purposes, thus eliminating all outflow and the need for disposal. The closed circuit unit handles toilet waste only. A special experimental closed circuit type unit was installed late in 1964 in the Mark IV Research House project at Rockcliffe RCAF Station. This is a modified and improved unit incorporating some of the knowledge gained from a unit operating in a similar research project in 1962/63, and it is for the purpose of exploring some of the problems encountered in the earlier type.

In co-operation with the Department of Northern Affairs and National Resources, a specially designed larger type of closed circuit unit was produced and installed to handle six toilets at a school at Cape Dorset, N.W.T. This unit came into operation in 1964 and is still operating and giving satisfaction. Some minor modifications have been made and the unit was observed and tested throughout 1965. The observation will continue at least into early 1966 after which further sampling and testing may not be necessary and the unit will continue to operate in a normal manner. Visits have been made to Cape Dorset and the most recent was in December 1965. One more visit by Ontario Research Foundation personnel will no doubt be made in 1966.

These units are now gradually passing out of the research and testing stage and the flow-through type is at present being produced in appreciable numbers in a compact package form in fibreglass by a company recently formed and known as The Converto Company Canada Limited and is

operated by a developer licenced through Canadian Patents and Development Limited. These flow-through package units can be modified to the closed circuit type and about 12 of such units will probably be installed in single family dwellings in the north during 1966 by the Department of Northern Affairs and National Resources. Half of these units will operate on a reduced flow-through basis as is used in certain areas in the north and the other half will operate on the closed circuit principle. These will be carefully observed by both the Department of Northern Affairs and National Resources and the Ontario Research Foundation.

During the year 1965 the Engineering and Construction Division was not directly involved in any operational activities relating to northern development. However, the Corporation's President, Mr. H.W. Hignett, and the Chief Engineer, Mr. A.J.E. Smith, accompanied the Honourable John R. Nicholson and representatives of the Indian Affairs Branch of the Department of Citizenship and Immigration on a ten day tour of Indian reservations and settlements in the northern part of the western provinces and the North West Territories. The main purpose of this tour was to gain first-hand knowledge of Indian housing and living conditions in a representative group of settlements.

As a result of this, the Corporation, in association with the Indian Affairs Branch, is considering ways and means by which the facilities of the National Housing Act and of Central Mortgage and Housing Corporation can best be utilized to help improve the environment of Canadian Indians.

Plans for 1966

Work will be undertaken as required for the Department of Northern Affairs and National Resources or for other agencies of the government.

Lending activities will continue at a level determined by the demand for and the supply of mortgage funds.

DEPARTMENT OF CITIZENSHIP AND IMMIGRATION

INDIAN AFFAIRS BRANCH

Responsibilities The administration of the Indian Act, as amended.

The fundamental responsibility of the Indian Affairs Branch is to assist Indians to participate fully in the social and economic life of Canada. These responsibilities are met by specific programs in the fields of education, economic development, social welfare and community development. All of these programs foresee the Indian people sharing the rights and responsibilities of citizenship and participating on the basis of equality of opportunity through the full spectrum of Canadian life.

Long-term Plans

The continued development of the natural resources of fur, fish and game is essential for Indians of the north who depend on these resources for a livelihood. The Indian Affairs Branch, in co-operation with other agencies, will continue to foster the development of sound trapping and commercial fishing programs, domestic fishing and hunting projects, and encourage Indians to participate in all aspects of tourism related to sports hunting and fishing. In addition, the Branch will continue to encourage and assist in the establishment of marketing co-operatives and the promotion of handicraft productions and sales.

In the field of education, the Indian Affairs Branch will continue to arrange for the enrolment of Indian children in the Yukon Territory in schools operated under the Yukon Territorial Government and explore means of having Territorial education services extended further to Indians resident in the Yukon.

With regard to welfare services the long-term objective is the total extension of such services to Indians administered by the Territorial welfare agencies.

Review of 1965 Operations

According to the Registered Indian Record, there were 5,330 Indians in the Northwest Territories and 2,281 in the Yukon as of December 31, 1964.

The production of handicrafts increased and local sales were up. Little inroad is being made in the southern market because prices seem to be higher than consumers are prepared to pay. During the year, a new company was established, financed in its development stages by the Province of Alberta and the Indian Affairs Branch, to co-ordinate production of handicrafts in the far north, northern Alberta, and other parts of the Province and to help develop central marketing. Indian craft producers are being included in the management of the new organization. Assistance has been given to Indians in obtaining beads and hides at cost.

Fur prices improved and became sufficiently firm to generate excellent interest in trapping, which resulted in an increased demand for grubstakes and equipment. Keen interest has been shown by Indians in travelling to isolated locations which had not been trapped by them for several years. Proposals for a fur program in the Mackenzie District including an amalgamated "Trapper Assistance Program", have been submitted jointly by the Northern Administration Branch and the Indian Affairs Branch.

Many Indians have shown a keen interest in fishing on inland lakes but this program has not progressed as rapidly as desired owing to problems dealing with security of tenure and licence limitation on these lakes. Assistance in the form of supervision and equipment was again made available and some success was realized in both summer and winter operations. A winter fishing operation was undertaken northeast of Fort Smith on a group of inland lakes with interim reports indicating a successful season.

The continued establishment of tourist accommodation on Great Bear Lake has provided increased opportunities for employment for Indians and about forty were again employed in 1965. Opportunities for employment in connection with sports fishing increased slightly in other areas as well, and efforts are being made to establish small groups of Indians on suitable lakes for the purpose of providing services to sports fishermen.

As the Department of Northern Affairs and National Resources has assumed responsibility in the Northwest Territories for placing Indians in employment, the Indian Affairs Branch staff in the main carry a co-operative and consultative role in this field. Effective measures were taken by the Department to facilitate Indian placement with the Branch assisting in the selection of Indian workers and paying the cost of transportation and other placement expenditures. Twelve hundred dollars was set aside to provide seed and fertilizer to Indians interested in raising crops.

In education, the total Yukon enrolment is 604 pupils. Of these 103 attend Carcross Indian Residential School and the remaining 501 are in territorial schools. Out of 167 in grades 7-12, 127 attend the Whitehorse Public Separate Schools whilst residing in the Yukon and Whitehorse Hostels. Forty-two pupils are enrolled in the Whitehorse Vocational School, thirty-three in vocational courses and nine in upgrading programs. Twelve students from the Yukon are enrolled in vocational and upgrading courses in British Columbia. During the year the Branch agreed to make contributions of \$39,643 towards the expansion of school facilities at Dawson and Whitehorse.

Construction was started on an Agency residence and office at Fort Good Hope. The residence has been completed and it is expected that the office will be completed early in 1966. A combination garage and warehouse was built at Yellowknife and a summer water line was installed at Hay River. Landscaping was undertaken at Fort McPherson, Hay River, Fort Rae and Yellowknife. An access road was constructed from the Hay River Indian Village to the Fort Smith Highway.

Thirty-eight applications for housing assistance in the Northwest Territories and twenty-one in the Yukon were approved. Seventeen houses started in the Northwest Territories during the last fiscal year but not completed and ten houses in the Yukon are expected to be completed by March 31, 1966.

In co-operation with the Territorial Government, a project area arrangement for community development purposes in the Fort Resolution area was entered into by the Branch on a 50/50 cost sharing basis. Also, the Branch has one recently appointed Indian Assistant Community Development Officer at Fort Smith.

To ensure that welfare assistance is available to Indians under eligibility conditions common to non-Indians in the north, the Indian Affairs Branch adopted Territorial Relief Rates and Regulations early in 1965 in accordance with the welfare policies and programs in the Yukon Territory and the District of Mackenzie.

A Regional Supervisor of Social Programs was appointed to administer the Departmental welfare program and to promote the extension of all welfare services and benefits to Indian residents of the Northwest Territories. He is stationed at Fort Smith.

During 1965, a Regional Indian Advisory Council was established in the District of Mackenzie. It is composed of eight members elected by the sixteen bands in the region. One meeting of the Council was held during the year and it is expected that at least two meetings will be held each year. Its main function is to advise the Regional Director of Indian Affairs on matters affecting the administration of Indian affairs in the District and on the plans and policies of Indian Affairs Branch. One member of the Council was elected to the National Indian Advisory Board, which was also formed during the year.

A representative of the Yukon was elected to the British Columbia-Yukon Indian Advisory Council and attended the two meetings of the Council held during 1965. The Yukon member was one of the four Regional Council members elected to the National Indian Advisory Board.

A report was prepared, "The Administration of Indian Affairs in the District of Mackenzie", which outlined in some detail the nature and extent of the work of the Branch in that area. It was prepared for the use of the interdepartmental committee studying the administrative structure serving ethnic groups in the North.

Plans for 1966

Expansion of trapping will be continued to encourage greater utilization of fur resources, with more emphasis on managed programs, the preparation of pelts, and dissemination of information on fur markets. This is included in proposals now under study. Development of commercial fishing on inland lakes will also be given renewed attention, with additional supervision and training provided.

A more comprehensive handicrafts development program will be adopted as staff and money become available. A survey will be made of handicraft production and marketing in the Northwest Territories so that its full potential may be exploited for the benefit of the Indian people.

Indians will be encouraged by both financial assistance and technical aid to supplement their diet and cash income by cultivating kitchen gardens and undertaking more extensive crop growing projects in good arable areas.

Provision is being made for the electrification of the Yellowknife Indian Village; for the installation of water and sanitary facilities at the Hay River Indian Village, Latham Island (Yellowknife), Snow Drift and Fort Simpson. In the Yukon, provision is being made for the drilling of five water wells at various locations.

Eighty-nine Indian houses will be built in the Northwest Territories and twenty-seven in the Yukon.

The Indian Affairs Branch is negotiating with the Government of the N.W.T. concerning the placement of an additional Community Development Officer in the District of Mackenzie. Plans are also progressing for the placement of a Community Development Officer at Watson Lake in the Yukon Territory.

Efforts are being made to recruit a Welfare Consultant to be located at Fort Smith.

IMMIGRATION BRANCH

Responsibilities Implementation and administration of the Immigration Act and Regulations in the North as elsewhere in Canada, including admission of immigrants, non-immigrants, returning Canadians and returning residents, and deportation of undesirables. In implementing the policy of the Government in respect of immigration, the Immigration Branch considers that it has an active part to play in promoting the development of the economy of the whole country including the North. This includes agriculture, natural resources, large scale industries, construction projects, small industries, businesses and services.

Long-term Plans

The long-term plan covers normal planning to meet responsibilities including a continuous assessment of the opportunities that are suitable for and will attract immigrants to the Northern part of Canada.

Review of 1965 Operations

During the year under review, there were 30 ports of entry operative in the far North. One was a full-time Immigration office, six were Customs offices and the remainder were maintained under an arrangement whereby officers in charge of R.C.M.P. detachments, heads of certain Canadian meteorological stations and commanding officers of certain R.C.A.F. stations have been designated as Immigration Officers in Charge and Special Inquiry Officers to administer the Immigration Act and Regulations. At these ports of entry 107,259 persons were examined comprising 14 immigrants, 9,695 returning residents and 97,550 non-immigrants. During 1965, there were no deportations. In the same period a total of 138 immigrants were placed in employment in the Yukon and Northwest Territories by Immigration officers and one immigrant from Austria was reported to have established a retail and sporting goods store in the Yukon.

The Medical-Welfare Agreement between the Federal Government and the Northwest Territories, covering assistance to immigrants who became indigent through accident or illness during their first year's residence in Canada, was continued.

Plans for 1966

Similar to 1965.

CROWN ASSETS DISPOSAL CORPORATION

Responsibilities Disposal of surplus Crown assets declared by government departments or agencies operating in the north.

Disposal of United States government-owned property located in Northern Canada under the provisions of Canadian Note 140 dated August 28th, 1961 and United States of America Note 52 dated September 1st, 1961.

Long-term Plans

Normal planning to meet requirements for disposal of surplus Government owned assets and special operations planning based on the changing requirements under certain United States Government operations in the Far North.

Review of 1965 Operations

CADC representatives carried out inspection and disposal of surpluses in the Yukon Territory, and the districts of Mackenzie, Keewatin, and Franklin. The carry-over of disposal and removal of surplus property from DEWLine beach heads and sites, left-over from the 1964 navigation season owing to ice conditions, was successfully completed during the 1965 season.

Plans for 1966

To continue normal disposal operations, modified as necessary to meet any changed conditions at DEWLine sites.

DOMINION BUREAU OF STATISTICS

Responsibilities Procurement and analysis of statistics for the Northwest Territories and the Yukon and their publication in the Bureau's regular reports.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

Census

During the year 1965, members of the Census Division discussed in further detail with the officials of the RCMP, the question of their participation in taking the 1966 Census of Population and Agriculture. This participation embraced not only the Northwest Territories (including the Eastern Arctic), but also the northwest corner of the province of British Columbia and the northern portion of the Yukon Territory, as well as the islands in Hudson Bay and James Bay. Included in these discussions were arrangements for the RCMP to recruit and use civilian enumerators in specified areas of the territory to be covered.

While the arrangements have been completed, the supplies are not expected to be forwarded to the various sub-division headquarters for transmittal to the detachments OC's until the end of January or early February, 1966.

Law enforcement

The statistics of cases heard by the Territorial Courts and Police Magistrates' Courts dealing with indictable and summary conviction offences and juvenile delinquency, appeals heard by the Courts of Appeal, the movement of guardroom prisoners, and the Police statistics of the R.C.M.P. and fire crime statistics of the Fire Marshal as reported to the Dominion Bureau of Statistics for the Yukon and Northwest Territories are published.

Health

Annual Returns of Hospitals were sent to 31 hospitals in the north for the 1965 reporting year - 26 to the Northwest Territories (17 federal, 8 public and 1 private) and 5 to the Yukon (3 federal and 2 public).

The distribution of these Returns is done through the Territorial Hospital Insurance Service Board. No direct contact is made with any hospital in the north.

Data obtained on these Returns are tabulated and published in a series of Reports - Hospital Statistics - Vols. 1-7 (83-210 to 83-216) plus Preliminary Annual Report (83-217).

The Yukon Superintendent reported on a weekly basis all cases of notifiable diseases in his Territory. Weekly reports covering the incidence of communicable diseases in the NWT were received from the Regional Superintendents of the Northwest Territories. The foregoing data were incorporated into the Dominion Bureau of Statistics' Annual Report of Notifiable Diseases; in addition, the data were included in the Dominion Bureau of Statistics' Notifiable Diseases Weekly Summary.

Hospitals in the Yukon and the Northwest Territories reported information on tubercular patients admitted, readmitted and discharged during the year. Since January 1961, a new system of case notification from the provincial tuberculosis case Registers has been in operation in Canada. Also co-operating in the system are the Yukon and the Northwest Territories, but in the absence of a case register, their tuberculosis notification cards are submitted monthly to the Dominion Bureau of Statistics by the Directorate of Indian and Northern Health Services of the Department of National Health and Welfare. Information from the case notification system formed part of the Dominion Bureau of Statistics' Monthly Reports, "Incidence of Tuberculosis".

Vital Statistics

Vital statistics tabulations for the Yukon and Northwest Territories are prepared annually by DBS from copies of registrations of births, stillbirths, marriages and deaths supplied routinely to the Bureau by the Territorial Division of the Department of Northern Affairs and by the Commissioner of the Yukon Territory. Certain of these tabulations are supplied to the two Northern Administrations or are available on request.

Both the Yukon and NWT administrations are separately represented on the Vital Statistics Council for Canada, which is composed of provincial and territorial officers responsible for the administration of vital statistics and which meets annually to discuss legislative, registration and statistical matters relating to the vital statistics system.

Education

Since 1955 reports on educational statistics of the same type as used in the Provinces have been collected from the public schools of the Yukon through the Superintendent of Schools at Whitehorse.

The same basic reports on teachers and enrolment have been adopted for the schools in the Northwest Territories and these have been collected annually by the Department of Northern Affairs and National Resources beginning with the school year 1959-60. These reports also include one on promotion and non-promotion of pupils similar to that used for the Indian schools but additional to the report forms used for the public schools of the provinces. The public school and the Roman Catholic separate school at Yellowknife and the Roman Catholic separate school at Hay River report the same as federal schools.

The Department of Northern Affairs and National Resources provided some information on expenditures on education including the finances of the Public School Board at Yellowknife. The Roman Catholic Separate School Board at Yellowknife reported finances directly to the Education Division.

Expenditures on education by the Territorial Governments of the Yukon and the Northwest Territories are extracted from territorial public accounts.

Statistics on elementary and Secondary education in the Yukon and the Northwest Territories are now being shown in all publications of the Education Division relative to this field.

International Travel

Statistics on international travel movements through ports in the Yukon were published monthly. These international statistics were obtained through customs offices at ports in the Yukon Territory; data on automobile movements were recorded by the Department of National Revenue and compiled by the Dominion Bureau of Statistics, and other travel movements were reported by the Department of Citizenship and Immigration.

Personal Income

Personal Income for the Yukon and the Northwest Territories is included in the National Accounts, Income and Expenditure. In 1964, it was \$55 million out of \$35,019 million, i.e. about one-sixth of one per cent of Canadian personal income.

Industry and Business

Net value of commodity production data are available up to 1962 from 1926 for the fishing, trapping, mining and electric power industries, from 1939 for manufacturing, and from 1940 for forestry (see Survey of Production report, Vol. 42).

The Industry Division regularly collects statistics for the Northwest Territories and the Yukon on electric power, logging, manufacturing and mining. Fishing statistics are collected for the Northwest Territories and the Yukon and pipeline statistics for the Yukon.

The confidential clauses of the Statistics Act preclude publication of the statistics by industry and territory except for mining, and pipelines. To avoid disclosure, statistics for the two areas combined are published in the case of both the electric power and manufacturing industries and with British Columbia in the case of the logging industry.

During 1965, the Merchandising and Services Division collected statistics from a sample of retail trade businesses for the purpose of estimating the volume of such business activities. Separate figures are not published for the Yukon and Northwest Territories, but are included with British Columbia. A survey of wholesale trade business was under development which will provide data on wholesale activities for the Yukon

and Northwest Territories. Statistics were also collected from hotels, power laundries and dry cleaning plants, motion picture theatres and funeral directors for the purpose of measuring the extent of these business activities. The data are combined with those of British Columbia for publication, except in the case of motion picture theatres where figures are published for the Yukon and Northwest Territories.

During 1965, the International Prices Section's activities in measurement of living costs for food, fuel and utilities in the Yukon and Northwest Territories were limited, pending review by the Interdepartmental Committee on Isolated Posts regulations of policy respecting application of such measurements.

Public Finance

Statistics on actual revenue, expenditure and debt of the territorial governments have been included in the Dominion Bureau of Statistics' annual reports on "Financial Statistics of Provincial Governments - Actual" for a number of years. The data are obtained from the Public Accounts of the Territorial governments, supplemented by information supplied by territorial treasury officials.

Quarterly statements of the revenue and expenditure of the government of the Northwest Territories are received regularly from the Department of Northern Affairs and National Resources and are incorporated into the Dominion Bureau of Statistics' quarterly statement of government transactions related to the National Accounts. Quarterly revenue and expenditure of the Yukon Territory, compiled from the Territorial Public Accounts, are also incorporated.

Actual financial data on revenues, expenditures, assets and liabilities for the four incorporated municipalities in the territories are obtained directly from the municipal officials and are included in the Dominion Bureau of Statistics' annual reports "Financial Statistics of Municipal Governments - Actual".

Data on rates of the principal taxes levied by the two territorial governments and their four incorporated municipalities are included in the Dominion Bureau of Statistics' annual report "Principal Taxes and Rates".

Liquor

Data on liquor sales, by type, and on profits of the liquor boards, are obtained from the liquor board authorities in both territories for inclusion in the Dominion Bureau of Statistics' annual report "Control and Sale of Alcoholic Beverages in Canada".

Transportation and Communications

Highway statistics for the Yukon Territory and the Northwest Territories were provided by the Departments of National Defence, Northern Affairs and National Resources and the officials of the local municipalities. Also reported by governmental authorities were statistics of motor vehicle registrations, gasoline and diesel oil sales, traffic accidents involving vehicles, and revenues derived from licences and taxes arising out of the operation of motor vehicles. Freight and passenger statistics were supplied by common and contract motor carriers operating within and in and out of both the territories. Reports are received from firms engaged in the moving and storage of household goods in and out of the Yukon Territory.

Statistics of railway operations in the Yukon Territory were provided by the White Pass and Yukon Route Railway. Canadian National Railways operations in the Northwest Territories are included in their reports.

Reports of civil aviation were regularly received from over two dozen carriers located in, or servicing, the Yukon Territory and Northwest Territories.

Water Transportation reports were regularly submitted by companies operating cargo vessels on the Mackenzie River system. In addition vessels entering the ports of the Northwest Territories reported particulars of cargoes loaded and unloaded.

Telegraph and cable statistics for the Yukon and Northwest Territories were obtained from the C.N.R. in Montreal.

Telephone statistics were provided for the Northwest Territories by the Bell Telephone Company of Canada. Canadian National Telecommunications provided telephone statistics for both the Yukon and Northwest Territories.

Employment

Employment and payrolls of the Government of Canada and its Crown Corporations, for services carried out in the Yukon and Northwest Territories, were covered by reports submitted each month by the responsible departments and corporations and in some cases by means of official documents of the Civil Service Commission, the Treasury Board and the Privy Council.

The government of the Yukon Territory and its Crown Corporations provide monthly statements of their employment and payrolls. The government of the Northwest Territories submits a quarterly statement on staff of the Liquor Commission. Departmental Services of the Northwest Territories' government are performed by employees of the Government of Canada. These employees are reported in statistics for the federal government departments.

At present, no information is collected with regard to municipal government employment and payrolls in the Territories and it is not presently known when such a survey will be undertaken.

Monthly data on employment, payrolls and man-hours were collected from a few industrial establishments in the areas engaged in mining, construction, transportation, communication and other utilities, and a few in manufacturing. Statistics for these areas are not separately published, but are contained in the Canada figures in "Employment and Payrolls" and "Man-hours and Hourly Earnings".

Fur

Data were obtained on the numbers and values of pelts taken in the regions for the Fur Season 1964-65.

Northwest Territories - Number of pelts exported from the Northwest Territories and the prices paid to trappers was provided by B.G. Sivertz, Commissioner, Northwest Territories, Ottawa.

Yukon - Number of pelts exported from the Yukon and the prices paid to trappers was provided by J.B. Fitzgerald, Director of Game, Department of Northern Affairs and National Resources, P.O. Box 2703, Whitehorse, Yukon Territory.

Plans for 1966

No change in plans for the collection of data on operations of hospitals in the north is anticipated.

The Vital Statistics Council for Canada is presently reviewing the content of forms used for registering births, stillbirths, marriages and deaths in the provinces and Territories with a view to adoption of

standardized forms in all areas. Although no change is anticipated for 1966, it is likely that the registration forms for the two Territories will be revised within the next 2-3 years to conform to the recommendations of the V.S. Council.

Discussions will be initiated with Territorial officers concerned regarding amending legislation to provide for compulsory registration of stillbirths of less than 28 weeks' gestation.

In 1966, the Merchandising and Services Division will, in conjunction with the Census of Population, carry out a census enumeration of retail, wholesale and service businesses in Canada. A mail census survey will follow the enumeration to secure business statistics and data relating to 1966 will be published for the Yukon and Northwest Territories during the year 1968. During 1966, the Merchandising and Services Division will continue to collect statistics from a sample of retail and wholesale trade businesses for the purpose of estimating the volume of these business activities. Separate figures will not be published for the Yukon and Northwest Territories. In the case of retail trade, the Yukon and Northwest Territories will be included with British Columbia. In the case of wholesale trade, figures will be published only for Canada with no breakdown by regions. Annual surveys of important service trades become part of the 1966 Census operation and, as noted above, data will be published for the Yukon and Northwest Territories.

It is expected that the review of policy will be completed during 1966 by the Interdepartmental Committee on Isolated Posts respecting living costs for food, fuel and utilities in the Yukon and Northwest Territories. The policy thereby established will determine the scope of surveys required to up-date or extend comparative living cost measurements.

ELDORADO MINING AND REFINING LIMITED

Responsibilities Maintenance of a shut-down uranium mining plant at Port Radium on the south-east shore of Great Bear Lake.

Long-term Plans

None.

Review of 1965 Operations

Maintenance was continued. The facilities were leased to a mining company operating a nearby silver property.

Plans for 1966

Caretaking of the Port Radium plant will continue. The facilities will continue to be leased to a mining company operating a silver property nearby.

DEPARTMENT OF EXTERNAL AFFAIRS

Responsibilities The Department of External Affairs is concerned with any activities in the north conducted on behalf of or in cooperation with foreign governments or their agencies, in particular scientific or other projects in both the civil and military spheres. The Department is also concerned with co-ordinating, by means of an interdepartmental committee, all forms of transportation in the Pacific Northwest (in particular, road, rail and marine transport) to the extent that these involve relations with Alaska and the U.S. federal authorities and, to this end is concerned with the general transportation problems of the part of the north adjacent to Alaska. The Department is similarly, though less actively, concerned with boundary waters in this area. The Department is also responsible for coordinating with the appropriate Departments the granting of permits, etc. for foreign scientists and explorers wishing to work in the north.

Review of 1965 Operations

Winter Maintenance of the Haines Road

Pending conclusion of certain studies of the transportation economics of this area, a decision with respect to keeping the Haines Road open all winter on a permanent basis has been deferred. Accordingly the arrangements covering the central portion of the road between Mile Post 48 and Mile Post 94, which have been in effect for the past two years, were renewed on the same experimental basis for the 1965-66 winter season by an exchange of notes between the Government of Canada and the United States Embassy in Ottawa, dated September 3, 1965 and September 15, 1965, respectively. The Department of Public Works was again granted authority to negotiate directly with the State of Alaska for the rental of road maintenance equipment on the same basis as for the previous two winter seasons. As in the past clearance of the southern portion which lies mostly in the Alaska Panhandle is being carried out by the United States Army; the northern portion is again being kept open by the Department of Public Works on the basis of reimbursement by the United States Army.

Prince Rupert Ferry Terminal

In 1965 the Department of External Affairs assisted the Governments of British Columbia and Alaska to conclude arrangements for alteration of a pier in Prince Rupert by 1965 and, subsequently, to work out an arrangement whereby this pier may be used by British Columbia Ferry Service.

DEPARTMENT OF FISHERIES

CONSERVATION & DEVELOPMENT, AND INSPECTION SERVICES

Responsibilities Conservation, protection, and development of fisheries through enforcement of the Fisheries Act, Fish Inspection Act, and their regulations.

Long-term Plans

To encourage the development of commercial, sport, and domestic fisheries wherever conditions are suitable, having regard to markets, transportation, access, and other factors. To promote greater utilization of fishery products by inspection, and assistance in the development of technological processes to obtain consistently high quality. To conserve and maintain the desirable fish populations by application of modern conservation measures whenever necessary.

Review of 1965 Operations

The fisheries of the Northwest Territories continue to be controlled from the Department's base at Hay River. It became necessary to establish a base of operation in northern Manitoba during 1965 in order to effectively supervise and control the rapidly expanding commercial and sports fishing activities in the Keewatin District.

Enforcement work on Great Slave Lake was carried out by means of patrol vessels in summer and bombardier snowmobiles in winter, with the assistance of aircraft during both seasons.

Officers from Hay River were again stationed on the Tree River to control operations and collect data in connection with the Arctic char fishery, and in the Mackenzie Delta area to supervise the commercial fishery in the western Arctic.

Very close liaison and collaboration with Northern Affairs and Indian Affairs officials, as well as the Fisheries Research Board field staffs were maintained to ensure proper utilization and protection of the resources.

A special inspection program was undertaken on Great Slave Lake in the summer of 1965 to isolate several water areas suspected of harboring poor quality fish which were presenting a marketing problem in the United States.

FISHERIES RESEARCH BOARD OF CANADA

Arctic Biological Station

Responsibilities Biological investigations of marine, freshwater and anadromous fishes and of marine mammals in the Canadian arctic, combined with limnological and oceanographical studies, aimed at developing authoritative guide lines for optimum utilization of fisheries resources.

Long-term Plans

To continue exploration for new fisheries, with increasing effort on basic productivity studies including year-round observations of the arctic aquatic environment; aimed at understanding the factors limiting fish and mammal production.

Review of 1965 Operations

Biological Oceanography Investigations

From July 24 to September 2 in the Strait of Belle Isle, along the Labrador coast and across Hudson Strait the M.V. "Calanus" returning to Frobisher Bay after refit at Montreal and Levis, Quebec, occupied 36 stations for plankton and benthos collecting, made 94 temperature, salinity and oxygen determinations and 29 BT drops, and collected zooplankton by vertical and horizontal hauls. Included were 3 lines of stations extending about 60 miles outward from the Labrador coast. The maximum collecting depth was 600 m. The zooplankton species composition is being analyzed with respect to the water masses.

Distributions of 200 pelagic copepod species in the Arctic Ocean and adjacent seas have been related to depth, water movements and water masses. Greatest species diversity occurs in the waters most strongly influenced by the Atlantic and Pacific Oceans, least diversity in unmixed arctic waters.

Phytoplankton in water samples and net collections taken in Great Bear Lake, 1963 and 1965, have been analyzed giving 250 species. All groups were scarce quantitatively, indicating extreme poverty of this freshwater lake. Freshwater algae predominate but there are some marine species of diatoms and silicoflagellates suggesting the occurrence of saline pro-glacial waters here. Extra-cellular starch grains, perhaps produced by Chlorophyta, were found with the phytoplankton. The quantity of starch grains was small (up to 10,000 per litre) as compared to quantities previously reported in marine habitats (up to 9 million per litre) and their nutritional value must be slight.

Fisheries Investigations

Freshwater Fish

Keyhole Lake, Victoria Island. A limnological study of this small (120 acres, mean depth 3 m) lake near Cambridge Bay, started in 1963, was continued from June 15 to September 8. Ice was 2.1 m thick occupying 63% of the lake volume. The annual heat budget, 11,800 cal/m², was relatively high for small lakes. Oxygen depletion lasted until July 6; the ice cover disappeared completely on July 24; then frequent oxygen supersaturation occurred until measurements ended on September 3. There was no thermocline but a chemocline persisted until the ice disappeared.

A tagging and recovery program, started in 1963, was continued on the land-locked unfished arctic char population. Length-weight relationship, sexual maturity, food and other determinations were made on 1800 specimens ranging in fork length from 10 to 45 cm.

Sticklebacks (Pungitius pungitius) are the only other fish species in the lake. Growth, maturity and food analyses were made on 250 specimens. The annual mortality rate was 78% from age 1 to 2; 63% from age 2 to 3. Ages determined from otoliths ranged from 1 to 5 years.

Tree River, District of Mackenzie. Arctic char angling data obtained by the Department of Fisheries showed 500 char caught in 1965 as compared to 1900 in 1964. The catch per unit of effort declined from 0.4 fish per rod/hour in 1964 to 0.16 fish per rod/hour in 1965, or by 60%, indicating that extreme overfishing had taken place in this productive river.

Great Bear Lake. Field work of a three-year limnological and fisheries survey of the lake was completed in September 1965. The 1965 work comprised three projects: (a) April 1-20: temperature, O₂, plankton, C-14 productivity measurements, and dissolved solid content under late winter conditions; (b) June 18-July 31: lake trout tagging from three base camps in McTavish Arm, when 919 were tagged; tag recovery is to be followed over the next few years to show extent of movement; (c) August 1-September 1: limnological survey and exploratory fishing in MacVicar, Keith and Smith Arms using the chartered M.V. "Radium Gilbert". Data of the three-year program are now being analyzed and manuscripts being prepared for publication.

Marine Fish

The M.V. "Salvelinus" fished with hand lines, long lines, gill nets, otter trawl and beach seine in Cambridge Bay harbour, Dease Strait, Coronation Gulf, and Bathurst Inlet. Severe ice conditions prevented work outside Cambridge Bay except from August 7 to 24. Suitable trawling bottom was scarce everywhere because of rocks with sharp reefs and ledges, but small areas of smooth bottom were found by echo sounding. Bathurst Inlet had few benthic animals in both kinds and quantity; but in shallow coastal waters fish were plentiful, particularly the saffron cod (Eleginus gracilis); capture of 3 specimens of the flatfish Hippoglossoides robustus at 65 fathoms made a first Canadian arctic record and extended the known range by 1800 miles. Summer tagging of 254 Greenland cod (Gadus ogac) in Cambridge Bay harbour and recovery of 13 in September indicated a fishable population of about 6000 and a total harbour population of about 12,000.

Greenland Shark. Data on the Greenland shark were obtained during the narwhal investigation on northern Baffin Island when 17 specimens ranging in length from 217 to 311 cm were attracted by offal and captured in the whale nets. They appeared to be abundant and could provide valuable dog food if the Eskimos would dry the flesh adequately to avoid harmful effects of the high urea content, as is done in Greenland.

Marine Mammal Investigations

Bowhead Whale. Preparatory to new studies, the present distribution of Balaena mysticetus was mapped from recent observations reported by RCMP detachments. In the eastern arctic the species now occurs from northern Hudson Bay around Baffin Island to Cornwallis Island and Somerset Island; in the western arctic from Tuktoyaktuk eastward

through Amundsen Gulf to Dease Strait. This agrees closely with former whaling grounds. The species has been scarce for many years but recovery is indicated.

Ringed Seal. Age determination on 96 jaws of Phoca hispida supplied by RCMP detachments from hunting and netting operations near Coppermine, showed that the sample contained 77 seals of the year and all other ages up to 10 years represented by 1 to 4 specimens. This supports the view that immature seals of the western and central arctic migrate from the area, possibly along the mainland coast, thus avoiding winter fast ice.

Narwhal. In 1965, the third and final year of intensive investigation of narwhal in northern Baffin Island, efforts from August 13 to 30 to capture specimens with nets yielded 17. There were two well-developed foetuses whose measurements suggest conception around mid May. Since births appear to occur in mid July, the gestation period is about 14 months, as compared to 13 for the white whale and $15\frac{1}{2}$ for the pilot whale. Enough material for a basic biological study has been collected but further aerial reconnaissance is needed to estimate the total population, particularly in northern Baffin Island.

White Whales. In late July aerial counts along the coast of Hudson Bay 200 miles north and south of Churchill gave a population estimate of 5000 to 10,000 animals. Of these, about 1000 formed a compact herd in Seal River, 500 were in Churchill River and 2000 to 6000 in the Nelson River estuary. Photographic surveys are needed for a more accurate estimate of these stocks on which the Churchill fishery depends.

Whale Marking. In July-August on the northward voyage of the 59-foot M.V. "Calanus", two sizes of "Discovery" type whale marks were successfully applied to minke and fin whales using .410 and 12 gauge shot guns. It appears that now with no whaling in most east coast waters, these species are sufficiently numerous and tame to be approached closely and marked from a small ship.

Harp Seals. During the past 10 years the age at sexual maturity of female Phoca groenlandica at La Tabatière, northern Gulf of St. Lawrence, has decreased less than on the Labrador "Front". The Gulf and Front stocks appear to be distinct, with the seals migrating southward past La Tabatière mainly those breeding in the Gulf. The Gulf herd appears to be exploited at a lower rate than the Front herd.

Catch and survival data on young Gulf harp seals form the basis of management aimed at maximizing long-term returns to the sealing industry. Since the Gulf fishery mainly takes young, the survival of particular year-classes should indicate the intensity of catch of each class. Survival tends to fall off when catch exceeds 80,000 annually, suggesting that the sustained yield in the Gulf is around 80,000 young seals annually; this level was reached in only 4 of the 12 years under study. A quota of 50,000 seals taken offshore plus an average take of 15,000 by landsmen, appears to allow an adequate margin before the sustained yield level is reached.

Grey Seals. A further 450 pups of Halichoerus grypus were tagged at breeding colonies in southeast Cape Breton Island and at Sable Island to show dispersal patterns in young seals. Behavioural studies carried out in southeast Cape Breton Island in June show that the adults remain close to the breeding site. They are extremely wary at this time and are difficult to kill. Thus any plan for controlled killing of grey seals to decrease the incidence of codworm, for which the grey seal is an important vector, could be successful only in the breeding season when pups may be easily taken.

Fin Whales Off Nova Scotia. Data on size, sex and feeding habits were obtained on 79 fin whales landed at New Harbour, 30 miles west of Halifax, from June to August. Biological samples were obtained for information on their ages and sexual maturity. All specimens had been feeding actively and krill (the crustacean Meganocyttiphanes norvegica) was the main food item.

Plans for 1966

Continue biological oceanographic studies from the M.V. "Calanus", particularly around the Baffin Island coast.

Continue exploratory fishing and biological oceanography in the central arctic from the M.V. "Salvelinus" operating out of Cambridge Bay and extending eastward into Queen Maud Gulf.

Advise on management of arctic char angling in various rivers and on experimental commercial char fisheries.

Prepare a scientific publication on the productivity of land-locked char in a small arctic lake.

Prepare scientific papers on completed three-year limnological and fisheries study of Great Bear Lake and on general fish studies in the Arctic Archipelago.

Continue narwhal investigation on Baffin Island including netting of specimens in Cumberland Sound.

Develop improved population estimate techniques for ringed seals and start new investigation in Cumberland Sound.

Round out life-history study of walrus by further winter observations and an aerial population census.

Continue life-history and population studies on harp seals related to commercial seal fisheries on the Labrador "Front" and the Gulf of St. Lawrence.

Aerial census of grey seals and tagging program in Gulf of St. Lawrence.

Observations on bowhead whales in arctic waters related to possible development of a fishery.

Tagging program on North Atlantic whales for population estimates related to the developing commercial fishery.

DEPARTMENT OF FORESTRY

Responsibilities To prepare forest inventories and forest management plans; to promote the adoption of improved methods of forest management and protection from fire best suited to the region; to conduct annual surveys and related research on forest insects and diseases; to provide advisory services to public and private forest management agencies on forest insect and disease control.

Long-term Plans

To determine the potentialities of the forest resources of the north, and to assist in the preparation of plans for their protection and utilization.

Review of 1965 Operations

Forest Management Research and Services Institute

Due to a delay in obtaining medium and large scale air photography of the Mackenzie River Delta, field work in that region that had been commenced in 1964 was deferred until 1966.

Mr. James Peaker went to Fort Smith in order to instruct wardens in forest survey techniques, particularly reconnaissance type surveys with a relascope.

While there he spent some time with Mr. J.H. Day and Mr. L.E. Philpotts, of the Federal Department of Agriculture, who were studying the possibilities of the Slave River Lowlands for ranching.

Mr. Peaker also visited stands on the slopes of the Cameron Hills south of Tathlina Lake as well as those along the Mackenzie River Highway from the 60th parallel to Yellowknife.

Alberta, Northwest Territories and Yukon Region

No silvicultural studies were conducted by this office due to lack of staff and the priority of more southerly projects.

Forest and disease surveys in the Mackenzie District featured a combination of air, boat, and ground procedures, employing three technicians and one research officer at different times from June to September.

In addition to general detection surveys of all forest pests, a special effort was made to assess losses due to the spruce budworm outbreak along the Slave and Mackenzie rivers and Commandra blister rust on Jack pine along the Yellowknife Highway. Boat surveys were confined to the Slave and Mackenzie rivers, and along the south shore of Great Slave Lake.

Reports covering operations are:

Baranyay, J.A. and Stevenson, R.E. 1966. Alberta - Northwest Territories - Yukon Region. Forest Insect Conditions. Annual Report of the Forest Insect and Disease Survey. Department of Forestry, Ottawa.

Robins, J.K. et. al. 1966. Annual District Report, Mackenzie District, Forest Insect and Disease Survey, Alberta-Northwest Territories and Yukon Region. Department of Forestry, Ottawa.

Plans for 1966

Forest Management Research and Service Institute

It is expected that the Services Section will send a two or possibly three man party to the Mackenzie River Delta to complete the survey commenced in 1964.

The Research Section also propose a two man party in this region to field sample a portion of the area covered by large scale air photography in 1965. This is a very interesting project as it could lead to forest surveys by air photography with no, or at least a minimum of ground sampling.

Alberta, Northwest Territories and Yukon Region

Due to the small staff available and the priority of Southern projects no silvicultural field work is being planned for the territories during 1966.

Surveys of forest insects and diseases will be continued, damage appraisal surveys of white spruce infested with the spruce budworm will be intensified as an aid to management and the recommendation of cutting practices.

DEPARTMENT OF JUSTICE

Responsibilities The administration of justice in the Territories, including the organization and maintenance of territorial courts of civil and criminal jurisdiction; the appointment of judicial officers, Justices of the Peace, Magistrates, Juvenile Court Judges, and related personnel; the direction and conduct of court proceedings on behalf of the Crown, including prosecutions under the Criminal Code and the Territorial Ordinances.

Long-term Plans

To improve, develop, and organize the administration of justice in the Territories in such a manner that, at the appropriate time, it may be transferred to the Territorial authorities as an officially and effectively working system. The "administration of justice", in this context, includes the organization of the courts, the conduct of criminal and civil litigation on behalf of the Crown, and all related matters.

Review of 1965 Operations

Criminal proceedings were conducted by Crown counsel, when necessary, before the respective superior courts, Justices of the Peace, and Police Magistrates, the last-mentioned also acting where appropriate as Juvenile Court Judges.

Proceedings which were not held in the larger centres were dealt with by local Justices of the Peace or when appropriate by the Magistrates and Superior Court justices on circuit. The day-to-day administrative duties respecting the courts were carried out by the clerks of the court and sheriffs.

Plans for 1966

A second legal officer of the Department will be stationed in the Yukon Territory.

DEPARTMENT OF LABOUR

Responsibilities Conciliation and other services for maintaining good industrial relations; administration of the fair wages policy, fair employment practices, annual vacations with pay, and female employees equal pay legislation; promotion and administration of the municipal winter works incentive program; sale and administration of government annuities; compensation to government employees for occupational injury or illness; development, promotion, and co-ordination of technical and vocational training programs; surveys of wage rates, hours of labour, and other working conditions.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

Industrial Relations

The Canada Labour Relations Board processed seven applications from trade unions for certification of bargaining agents. Six of the applications affected units of employees in the Yukon Territory and the seventh affected a unit of employees in the Northwest Territories.

Four industrial disputes were mediated involving companies and trade unions in the Yukon and Northwest Territories. One dispute was in the Yukon Territory and the other three were in the Northwest Territories.

Assistance under the Technical and Vocational Training Agreement

Financial assistance has been provided by the Department for an addition to the Whitehorse Vocational School in the Yukon Territory which is under construction. This addition will house new technical training facilities and a Commercial Division which will be transferred from the F.H. Collins High School. The new technical training facilities will enable more refresher courses to be given to persons wishing to write for tradesmen's qualification certificates. Since the inception of the Apprentice Training Program in the Yukon Territory, demand for these courses has been heavy, with 60 auto mechanics qualifying so far.

Financial assistance has also been given to the Government of the Northwest Territories for the operation of all programs under the Technical and Vocational Training Agreement.

Accident Prevention and Compensation Branch

Claims of federal government employees, regularly working in the Yukon and Northwest Territories, for compensation for occupational accidents or diseases were received, adjudicated, and paid by the Alberta Workmen's Compensation Board, under a federal-provincial agreement. A total of 527 claims was received and disbursements were \$100,675.00.

Economics and Research Branch

The Economics and Research Branch conducted two annual surveys - one on wage rates, salaries, and hours of labour, the other on working conditions - covering 28 establishments in the Yukon Territory and 34 in the Northwest Territories. Not included in these figures are two corporations - the Northern Canada Power Commission and the Royal Bank of Canada - whose returns cover all localities served in both territories. The Branch also maintained a file of collective agreements covering employees in these areas.

Annuities

No statistics are available on the number of government annuities sold in the North but it is believed to be small. Sales and other business relating to government annuities were carried out by correspondence.

Municipal Winter Works

During the winter of 1964-65, the Town of Hay River in the Northwest Territories carried out four projects under the Municipal Winter Works Incentive Program at a cost of \$18,847 and providing 216 jobs for a total of 2,849 man-days of work. No projects were undertaken in the Yukon Territory during the winter of 1964-65. In respect to the 1965-66 program twenty-five municipalities in the Northwest Territories have submitted projects with an estimated cost of \$165,000 providing an estimated 404 jobs for a total of some 8,935 man-days and to date no application for projects have been submitted for the Yukon Territory.

Winter House Building

Under the 1964-65 Winter House Building Program, two houses were built in the Yukon Territory and in respect to the Northwest Territories, while 15 applications were submitted, 13 houses only were built. Under the 1965-66 Winter House Building Program, 4 applications have been submitted from the Yukon Territory and 10 from the Northwest Territories.

Fair Wage Schedule

Sixty-three "fair-wage" schedules in the Northwest Territories and 30 in the Yukon were established for federal government construction contracts. Also 635 recommendations were made for establishing wage rates for prevailing rate of employees of the federal government in the Northwest Territories and 111 in the Yukon Territory.

Plans for 1966

Normal operations.

Note: Activities in the area of training and under the Municipal Winter Works Incentive Program will come under the jurisdiction of the Department of Citizenship and Immigration.

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOGRAPHICAL BRANCH

Responsibilities Obtaining data, through field investigation and compilation, on physical, economic, and social (including urban) geography. Preparing suitable maps and explanatory reports, describing and interpreting these geographical phenomena. Assisting in other phases of planning and development through the provision of fundamental geographical data, including the investigation of questions of geographical nomenclature in the North.

Long-term Plans

To complete preliminary reconnaissance terrain mapping by areas according to the National Topographic System, bearing in mind the constant need for more detailed investigations in areas of economic importance. Prerequisites of this objective include the solution of problems associated with cartographic portrayal of surface conditions and the build-up of skills in detailed air photo interpretation. These problems are being tackled by conducting detailed, long-term field investigations in specific areas, such as Ellef Ringnes, Meighen and Baffin islands and the Mackenzie River Basin. Experimentation in precise geomorphological mapping is underway, and the detailed study of problems in physical geography, concentrating on glaciology, hydrology, and landscape evolution, is being undertaken, both as a justified objective in itself, and as a means towards future extrapolation to cover large areas on a reconnaissance basis.

To complete the mapping and interpretation of data on the distribution of ice in Canadian waters; to conduct a full appraisal of break-up and freeze-up conditions in Canadian rivers and lakes; to complete a study of the distribution and regime of glaciers and ice caps.

To complete a study of northern settlements and site factors and additional aspects of the economic and human geography of the North.

Review of 1965 Operations

Field studies in the Mackenzie River Basin continued with surveys of the pattern of break-up of the winter ice on the main river and in its tributary channels in the delta. Additional studies in geomorphology included ground ice studies and its significance for mass wasting processes

and shore line recession; permafrost features were also studied.

On Baffin Island a study in geomorphology, glaciology, hydrology and botany continued with concentration in three areas: on the east coast near Clyde and Inugsuin fiords, on and around the Barnes Ice Cap and along the west coast near Longstaff Bluff. Work on the east side of the island emphasized the geomorphology along the outer coast. On the Barnes Ice Cap glaciological investigations continued and were expanded to include the southernmost part of the ice cap. A long-term study of the mass balance of a small mountain glacier was initiated in the eastern mountains as part of the Branch's contribution to the International Hydrological Decade. A total of 28 geographers and assistants were in the field operating out of base camp at Inugsuin Fiord where a permanent hut was built at the beginning of the field season.

Investigation was completed for 285 new geographical names and 183 contentious names during the processing of 65 new maps and charts and 71 general submissions. Nearly 3000 previously approved names were reviewed for orthography and application.

Plans for 1966

Twenty geographers and assistants will continue the work on Baffin Island between early May and early September. The International Hydrological Decade program will be continued and work on the Barnes Ice Cap will be expanded to include measurement of ice movement and englacial temperatures. Detailed studies of the late- and post-glacial sea level changes will be carried out along Ekalugad Fiord and intensive studies of the glacial deposits will be undertaken north of Cape Christian with special reference to the fossil content. The process of sandur formation and mass wasting in an Arctic environment will be studied in detail.

Work in the Mackenzie area will be continued by three geographers and the program will include a winter trip to study winter conditions in the area and later break-up of the river ice will be surveyed from the air. The detailed geomorphological studies on the islands north of the delta will be continued.

GEOLOGICAL SURVEY OF CANADA

Responsibilities To describe and interpret by means of appropriate reports and maps, the geology of bedrock and unconsolidated deposits, including those under the continental seas; to investigate and assess mineral resources and the geological factors affecting their formation, discovery, and development; to provide fundamental geological data for engineering and water-supply projects and other factors affecting land use; and to make contributions to the science of geology, including geophysics and geochemistry.

Long-term Plans

Highest priority during the past decade has been given to the preliminary reconnaissance study and mapping of the Yukon Territory and Northwest Territories. More than 80 per cent of the north has now been covered on reconnaissance scales (1 inch to 8 miles, and 4 miles). Only two major gaps in coverage remain, an area in District of Mackenzie south, west and northwest of Great Bear Lake, and the central part of Baffin Island; smaller areas yet to be covered include Southampton and Coats Islands, the eastern third of Devon Island, and several scattered areas in Yukon Territory. The effort devoted to this work will now decline gradually until its completion several years hence. This reconnaissance has gone far towards meeting the immediate demands of the mining and petroleum industries for general information on remote areas, and permits preliminary estimates of mineral potentials.

The effort devoted to the detailed study of critical areas and problems disclosed by the reconnaissance work, and to investigations of mineral areas, is expected to increase steadily during the next few years, particularly in the Yukon Territory and the Districts of Mackenzie and Keewatin.

Aeromagnetic Surveys made by or for the Geological Survey are primarily a supplementary method of obtaining reconnaissance geological data. As a result of an \$18 million cooperative program of aeromagnetic surveying started in 1961, it is expected that an aeromagnetic survey of the Canadian Shield in the Northwest Territories, and currently

amenable parts of the Yukon, will be completed within about a decade. The surveys are being made by contracts with commercial survey companies. Experimental surveys undertaken in British Columbia in 1964 and 1965 have led to the development of practicable and reasonably economic ways of making detailed aeromagnetic surveys of mountainous terrain and thus make additional areas of the Yukon Territory amenable to these surveys.

The 8-mile geological reconnaissance of the District of Franklin north and west of Baffin Island was completed by the end of the 1964 field season. Helicopter-supported reconnaissance surveys of the northwest and southeast parts of Baffin Island have been completed and two other such projects will follow, with the object of completing the initial survey of the island, and the District of Franklin, within the decade or shortly thereafter.

As a follow-up to the initial 8-mile reconnaissance, the 2-mile mapping and study of the Bathurst and adjacent islands started in 1963, will be continued by similar investigations of other critical areas and by stratigraphic-palaeontological studies required to solve specific problems. Aeromagnetic surveys, and studies of the marine geology of the north-western continental shelf and adjacent channels, will keep pace with the Polar Continental Shelf Project as the centre of that effort moves southwesterly from Isachsen. It is unlikely that the general level of Geological Survey activity in the Arctic Islands, except Baffin Island, will increase significantly in the next few years.

Review of 1965 Operations

Twenty parties spent the entire field season in Yukon Territory or Northwest Territories, and two others spent part of the season. The results of their work have been outlined in Geological Survey of Canada Paper 66-1, released 10 January, 1966.

In the District of Franklin, Operation Amadjuak with two helicopters and one fixed-wing aircraft completed reconnaissance geological studies of southern Baffin Island south of latitude 66° north except for Resolution and adjacent islands. Four geologists concentrated on bedrock features, and one on glacial geology. Most of the region is underlain

by a Precambrian complex of gneisses and granitic rocks in which no mineral occurrences of economic importance were seen. In some areas, gently dipping Palaeozoic sediments cover the Precambrian rocks; it is unlikely that the relatively thin Palaeozoic section contains petroleum reservoirs. A second, major project, Operation Grant Land, was commenced in northeastern Ellesmere Island. This investigation of some 30,000 square miles was supported by helicopter and Piper Cub aircraft and included parties studying the Palaeozoic eugeosyncline, metamorphic terrain, and several aspects of stratigraphy including work in northwestern Greenland to relate geological formations and structural features across the narrow body of water separating northeastern Ellesmere Island and northwestern Greenland (Hall Land). A party continued studies and collecting of fossil vertebrates in Somerset Island; the quantity, quality and variety of vertebrates found have important bearings on biostratigraphical, palaeontological and palaeogeographical problems. Another party of two staff geologists began a two-year study of the stratigraphy and structure on Cornwallis Island and neighbouring smaller Islands. This party also spent part of the summer in completing studies of Bathurst Island of the previous two field seasons. Two staff geologists carried out a coordinated study in and around the iron deposits of Baffinland Iron Mines Ltd. in northern Baffin Island. Geological mapping of about 750 square miles was completed on a scale of 1 inch to 1 mile, and five of the principal deposits were investigated in detail.

In the District of Keewatin one party completed studies of the stratigraphy and structure of Proterozoic and Archaean rocks of the Kognak River area. A geophysical group carried out a detailed aeromagnetic survey in central Hudson Bay in cooperation with the National Aeronautical Establishment and the R.C.A.F.

As both the navigational and aeromagnetic data were digitally recorded it is hoped to automate the compilation of the total intensity maps as much as possible. Another geophysical party carried out crustal refraction and conventional marine refraction surveys from ships in Hudson Bay. An aeromagnetic survey of part of southern District of Keewatin, south of Chesterfield Inlet was completed as a contracted project.

In the Districts of Keewatin and Mackenzie one party resumed a stratigraphic and petrologic study of the Dubawnt Group begun in 1963 with the purpose of determining the internal make-up of this group of flat-lying sediments and volcanic rocks of Proterozoic age. This party also carried out an experiment in semi-detailed helicopter mapping of the Schultz Lake map-area, near Baker Lake, where sedimentary and volcanic rocks appear to be of economic interest.

In the District of Mackenzie one party continued a three-year program of regional studies in the gold-bearing rocks in the Contwoyto Lake area, and another completed detailed studies of the Goulburn Group sediments at the north end of Contwoyto Lake. A third party continued investigations of the stratigraphy and structure of Proterozoic rocks in the Rocknest Lake area, the need for which was disclosed by Operation Coppermine in 1959. Another party began a study of the Nonacho Group of sedimentary rocks and its regional setting east of Great Slave Lake. And in the same general region one party began a study of the paragenetic and structural history of migmatitic and mylonitic gneisses that occur between the MacDonald Fault (south side of East Arm, Great Slave Lake) and Nonacho Lake. The pattern of and movement along major faults in the area are included in this study. During August, one party carried out a preliminary stratigraphic study of the Quaternary deposits that mantle much of the Arctic Coastal Plain between Cape Bathurst and the Alaska boundary (including the Mackenzie Delta region).

In the Yukon Territory Operation Selwyn, a three-year project, was commenced. This comprises a systematic investigation of the geology in southern Selwyn Mountains, Hyland Plateau, and Cassiar Mountains of the northern Cordillera. This major project was supported by extensive use of helicopters. Another party continued investigations in Tombstone River map-area and in parts of Upper Klondike River map-area. Some small showings of metallic minerals were discovered in addition to those reported previously. A third party examined four potential dam sites suitable for hydro-electric power development on Pelly River. These engineering geology investigations were carried out at the request of the Water Resources Branch of the Department of Northern Affairs and National Resources, and priority was given to these particular sites because of recent mining developments in this area. Another party studied the limits of successive ice advances and other aspects of surficial geology in central and southwestern Yukon. A fifth party carried out a metallogenic study of the beryllium-tin province of the Cassiar batholith in Yukon and British Columbia. The region is noted for the number and variety of its mineral deposits.

Plans for 1966

Some 23 field parties are planned for the Yukon and Northwest Territories. Five parties will be in the District of Franklin, three in the District of Keewatin, seven in the District of Mackenzie, three in the Yukon Territory, and five will operate in more than one of the Territories, Districts or Provinces. In addition, three aeromagnetic surveys will be carried out under contract.

In the District of Franklin one specialist will study Devonian biostratigraphy in Ellesmere Island. A large party with fixed-wing and helicopter support will complete studies on the deformed rocks of northeastern Ellesmere Island. In Baffin Island one party will continue the detailed investigation of iron deposits in the Mary River area, and another will complete the studies of surficial geology in the southern part of the island covered by Operation Amadjuak in 1965. A specialist will carry out geomorphological mapping to characterize mass wasting and permafrost phenomena in an area yet to be selected. Aero-magnetic surveys by contract will be undertaken in northern Baffin Island and in the area of the Polar Continental Shelf north of Banks Island.

In the District of Keewatin three coordinated parties will commence studies of volcanic-sedimentary assemblages, granitic rocks, and economic geology in the northern part of the Ennadai orogenic belt near and southwest of Rankin Inlet; these are part of a major, multi-disciplinary project planned for this economically interesting region over the next several years. Another party will complete stratigraphic investigations of the Dubawnt Group of sedimentary and volcanic rocks in the Districts of Keewatin and Mackenzie.

In the District of Mackenzie a study of the volcanic rocks of the Coppermine River Group will be carried out. Another party will complete a regional study of gold-bearing rocks in the Contwoyto-Point Lakes area. A third party will continue work in the Rocknest Lake region on critical geology recognized on Operation Coppermine in 1959, with particular emphasis on determining the usefulness of stromatolites in stratigraphic studies. A comprehensive investigation of the stratigraphy, sedimentology and tectonics of the Proterozoic basin in the East Arm, Great Slave Lake, will be commenced as a doctoral thesis project. South of the East Arm, another party will continue studies of the structure and petrology of gneisses and the pattern of major faults. In the Nonacho Lake region, east of Great Slave Lake, a party will continue detailed studies of stratigraphic and sedimentological problems of the sedimentary rocks of the Nonacho Group. In the Yellowknife area, hydrogeological studies will be undertaken to develop methods of groundwater research in permafrost areas. An aeromagnetic survey by contract will be carried out in the area south of Bathurst Inlet.

A helicopter-supported operation will continue stratigraphic and structural studies in a large area of southeastern Yukon and southwestern Mackenzie, and adjoining parts of British Columbia. Another party will continue Pleistocene stratigraphy studies of the Mackenzie delta region and adjacent Arctic coastal areas between Cape Bathurst and the Yukon-Alaska border.

A tectonic analysis of the northern Cordillera in District of Mackenzie and Yukon Territory will be commenced. An engineering geologist will continue the examination of potential power dam sites in Yukon and Mackenzie, part of a long-range program in conjunction with the Department of Northern Affairs and National Resources. Investigation of the metallogeny of beryllium and tin in the Cassiar Batholith region of Yukon and British Columbia will be continued.

In the Yukon Territory, a specialist will study Quaternary stratigraphic palynology. Another party will carry out a reconnaissance of surficial geological features in the Hishihik Lake area leading to detailed studies in selected areas. And in the Snag-Kluane Lake region glacial geology and chronology will be the subject of a doctoral thesis.

INTERDEPARTMENTAL COMMITTEE ON AIR SURVEYS

Responsibilities To receive from all federal government services requests for air surveys, and to prepare programs of air survey priorities; to issue technical instructions for carrying out such programs, and to co-ordinate the activities of commercial and government air survey organizations.

Long-term Plans

The Yukon Territory, Northwest Territories and Arctic Islands are now covered with vertical air photography for small scale mapping. Additional mapping photography and photography of special areas for development, scientific investigations and large scale mapping will be provided to meet the annual requirements of federal government departments and agencies.

Review of 1965 Operations

Air survey operations during 1965 were carried out in the north for the various departments as follows:

<u>Department</u>	<u>No. of Areas</u>	<u>Territory</u>	<u>Amount</u>
NA & NR	31	Yukon, NWT and Arctic Islands	\$21,000
DND	2	NWT	\$131,000
M & TS	3	Yukon	45,000
Forestry	3	Yukon	<u>19,000</u>
Total expenditure 1965,.....			<u><u>\$216,000</u></u>

Favourable weather in two areas in the Northwest Territories during the past season resulted in good progress on two main operations. However, in the Yukon Territory the weather was less favourable and progress on photographic operations there were considerably delayed.

Plans for 1966

Plans for air survey operations for 1966 in the north for various departments are as follows:

<u>Department</u>	<u>No. of Areas</u>	<u>Territory</u>	<u>Amount</u>
NA & NR	15	Yukon, NWT and Arctic Islands	\$13,000
DND	1	NWT	85,000
M & TS	6	Yukon and NWT	\$228,000
C. & I.	9	Yukon	5,000
Forestry	1	Yukon	5,000
Agriculture	1	NWT	<u>30,000</u>
Anticipated expenditure 1966			<u><u>\$366,000</u></u>

MARINE SCIENCES BRANCH

Responsibilities To carry out hydrographic and oceanographic surveys in Arctic waters.

To produce and distribute charts, sailing directions, tide tables, and reports based on survey activities and on information from all sources.

To carry out research on the oceanography of the region.

Long-term Plans

To complete standard hydrographic surveys of the Arctic coast as soon as possible, and to continue the publication and maintenance of up-to-date charts of the region. To carry out reconnaissance surveys where requirements exist for charting ahead of the regular surveys. To maintain reliable sailing directions as published in the Pilot of Arctic Canada. To establish and maintain a network of gauging stations to meet the needs of scientific research. To carry out oceanographic and current surveys to meet general scientific requirements including those of defence. To improve steadily the capability to carry out fundamental research on Arctic oceanography and the means to conduct observations in the region.

Review of 1965 Operations

Oceanography - by Project Groups.

(1) Physical Oceanography Group

From August 27 to October 24, 1965, eight oceanographers from the Bedford Institute of Oceanography with the assistance of two men from the U.S. Naval Oceanographic Office conducted oceanographic and magnetometer surveys in the northern Labrador Sea, Davis Strait and Baffin Bay. Magnetometer surveys were conducted in Jones Sound, Lancaster Sound, and Baffin Bay. In total 125 oceanographic stations, 10,300 nautical miles of magnetic coverage and 70 bottom grab samples were obtained. Twenty-four

oceanographic stations were occupied at the request of the U.S. Naval Oceanographic Office as part of their ice-forecasting program. This work was conducted from the Department of Transport icebreaker CCGS LABRADOR.

(2) Geophysical Group

During the periods from June 30 to July 7 and August 27 to October 24, 1965, 10,365 nautical miles of magnetic and bathymetric coverage were acquired in Labrador Sea, Hudson Strait, Davis Strait, Baffin Bay, Lancaster Sound and Jones Sound. These data were obtained for the following purposes:

- (i) In a reconnaissance sense, to reveal unmapped geological structures and to extend previously mapped geological phenomena such as upland mountain belts, sedimentary troughs, faults and fold belts;
- (ii) To investigate the possibility of a median ridge between Greenland and North America;
- (iii) To study the relative motion of some of the Canadian Arctic islands in the past and the possible relative motion of Greenland and North America;
- (iv) To investigate the relationship between the concentrated earthquake activity in Baffin Bay and a possible median ridge.

(3) Marine Geology Group

The Marine Geological program over the Arctic Ocean is summarized by Dr. E.F. Roots, Coordinator, Polar Continental Shelf Project, and involved sampling over the Arctic Ocean. Sampling was also done from the CCGS LABRADOR in the Baffin Sea. The major endeavour was in Hudson Bay which is summarized below.

Under the coordination of B.R. Pelletier a combined oceanographic-geological-geophysical cruise, involving divisions of government, six universities, and industry, was undertaken in Hudson Bay between July 16 and September 26 and involved the following support: CSS HUDSON, M/V THERON, a Hiller 12E helicopter, 4-engined NORTH STAR, 2 hydrographic launches, and a barge. Approximately

30,000 miles were steamed and about 25,000 flown, most of which was undertaken in Hudson Bay. More than 900 oceanographic stations were occupied and almost 1,000 special spot soundings made by means of a helicopter-borne transducer. Survey work involved the following: air-borne magnetometer (NORTH STAR); sea magnetometer (HUDSON & THERON); surface gravity (HUDSON); bathymetry (all sea vessels above); continuous sub-bottom, seismic profiling (launches, barge, HUDSON); seismic profiling for geological structures and thicknesses (HUDSON & THERON); seismic deep crustal studies (HUDSON & THERON); VLF positioning (HUDSON); Decca logging (HUDSON); and geophysical data logging (HUDSON).

Station work involved the following although all operations were generally not carried out at each station: bottom grabs, geological dredging, biological dredging, coring, vertical plankton hauls, bottom photography, current observations; sampling of bottom water (temperature, salinity, oxygen, and silicates); study of benthonic invertebrates and bottom gravity. Except for photography and plankton work, which were done from THERON exclusively, all other station work was carried out from both HUDSON and THERON. In addition, geological formations were studied around the Bay, and raised beaches on islands and the peripheral mainland of the Bay were sampled for the purpose of determining rates of uplift of the Bay itself. Seismic listening stations were set out at several locations on the islands and mainland.

(4) Frozen Sea Group

During the period January-March experiments on heat flow and temperature profiles in sea ice were continued from the previous year at the field location in Cambridge Bay, Victoria Island, N.W.T. An investigation of the water column under a growing ice sheet was carried out and as a result a contract was let to a Cambridge Bay resident to carry out time series observations throughout the year. Analysis of the heat flow data as received from the computer has been proceeding. Work is centred on devising the simplest possible model giving an adequate description of the thermal properties of sea ice for practical purpose. The effect of ice growth on water column structure is beginning to be understood and it is hoped that next winter's work will enable a more nearly complete picture to be seen.

Hydrography

(1) Eastern Arctic

Hydrographers were assigned to two Canadian Coast Guard icebreakers in the Eastern Arctic, the CCGS John A. Macdonald and the CCGS d'Iberville for part of the season, with all three hydrographers joining forces on the d'Iberville for the major survey at Milne Inlet. A standard survey was conducted in the lower half of Milne Inlet, with track soundings from launches running parallel courses in Navy Board Inlet and Eclipse Sound. Stretchline soundings off the site of a proposed wharf were carried out: the results of this survey will be used by the C.D. Howe Company in their studies of the harbour area. The survey in Milne Inlet and adjacent area was carried out mainly on behalf of the Baffinland Iron Mines Ltd., who are engaged in the exploration of a rich ore deposit, about sixty miles southeast of the south end of Milne Inlet, on Baffin Island. A total of 10,472 miles of track sounding was recorded during the season. En route to Milne Inlet the survey of the approaches to Resolute Bay was continued for the relocation of ranges, to enable deep draught ice-breakers to enter the bay. At Sherwood Head fog conditions prevented an attempt to tie in control for shoreline positioning. Similar weather conditions prevailed at Eureka, where an attempt was made to tie in local control in Slidre Fiord to topographical tellurometer traverse. Sounding was carried out at Tanquary Fiord, and off the river delta for Defence Research Board Party. Sailing Directions were reviewed at Arctic Bay and Strathcona Sound. At Pond Inlet local control was re-established and tied to Shoran control. Data was obtained in this area for chart revision.

(2) Western Arctic

Before the ice cleared from Tuktoyaktuk in July, helicopters were used to extend control east and west to provide a firm basis for future surveys. The C.S.S. Richardson continued the detailed survey of Kugmallit Bay using radar transponder beacons. This was followed by Richardson making a detailed survey of the approaches to Coppermine River. Before returning to Tuktoyaktuk, reconnaissance surveys were made in Coronation Gulf, eastward to Tree River and in Dolphin and Union Strait.

(3) Polar Continental Shelf Project

Three hydrographers of the Canadian Hydrographic Service were assigned to the Polar Continental Shelf Project, which completed surveys in Cardigan Strait using Hi-Fix and helicopters. Helicopter reconnaissance surveys were conducted in Ballantyne Strait and the Continental Shelf off the north-west coast, and also at Prince Patrick Island. A reconnaissance survey of the northern approaches to Robeson Channel was made by plane, to assist the planning of a 1966 survey. Two Sikorsky S-55 and one Bell 204 B helicopters, also an Otter aircraft, were attached to the project.

(4) Tide Gauges

The installation of new permanent tide gauges at Port Harrison, Churchill Harbour and Cape Parry was started. Due to adverse weather conditions and the lack of certain items of technical equipment, these projects will not be completed until the season of 1966. Existing gauges at Churchill, Resolute, Alert, Tuktoyaktuk and Cambridge Bay were checked and serviced. The gauge at Frobisher could not be put in operation. The publication of Tide Tables for "Hudson Bay and Arctic Waters" was revised for 1965 usage.

(5) Charts

Seven new hydrographic charts (one standard, three preliminary and three provisional), eleven new editions and ten supplementary ozalid prints were issued.

(6) Sailing Directions

Supplements were published to up-date Volumes Two and Three of the Arctic Pilot.

Plans for 1966

(1) Physical Oceanography Group

No plans are being laid for conducting physical oceanographic research in Arctic waters during 1966. It is expected, however,

that 24 oceanographic stations will be occupied on behalf of the U.S. Naval Oceanographic Office program of ice forecasting in Davis Strait and Baffin Bay during a BIO geophysical survey being planned under Mr. D. L. Barrett.

(2) Geophysical Group

A geophysical survey of the area between Greenland and Canada is planned in 1966 employing the DOT ship CCGS LABRADOR. It is intended that shipborne gravimeter and magnetometer surveys will be carried out and a helicopter will be utilized to extend magnetometer survey coverage at sea to geologically mapped areas on land.

(3) Marine Geology Group

Marine Geology will be continued over the Arctic Ocean on an extensive sampling program. Separate studies in the inshore and channel areas of the Archipelago will also be undertaken. These projects are summarized by Dr. E. F. Roots, Coordinator, P.C.S.P. An investigation of Ungava Bay aboard a DOT icebreaker is also planned and will involve both geological and geophysical reconnaissance.

(4) Frozen Sea Group

It is intended to return to Cambridge with a party of four to five for the period March-April to conduct further investigations of water structure beneath the ice and its relation to ice growth.

Hydrography

(1) Eastern Arctic

Hydrographers will again be assigned to Department of Transport Coast Guard ice-breakers. The 1966 projects include surveys at Baffin Island, Bylot Island and adjacent channels, and the continuation of the 1965 survey at Milne Inlet. Reconnaissance soundings will be recorded in the areas of Baffin Island, Clyde Inlet, Sam Ford Fiord, McBeth Fiord, Hecla and Griper Bank. A shoal examination will be conducted at Iniguitsin Fiord.

(2) Western Arctic

The C.S.S. Richardson will continue the survey of Kugmallit Bay, including the eastern entrance to Tuktoyaktuk Harbour. This survey will be extended eastward in the direction of Atkinson Point. In August, surveys are scheduled at King's and Queen's Bays, Holman and Sachs Harbour to Cape Kellet, the shoals in the approaches to Gillet Bay and Hepburn Spit. Two hydrographers and a new sounding launch will join CCGS CAMSELL when she reaches Tuktoyaktuk. It is planned that this party will survey the approaches to the trading post at Perry River, survey Spence Bay and extend the sounding coverage in the approaches to Cambridge Bay and Hat Island. The sounding coverage will also be improved between Brands Point and Astrup Island.

(3) Polar Continental Shelf Project

Hydrographers will be attached to this project for work on the Continental Slope off Prince Patrick Island, Hazen Strait (Western Portion), and Hecla and Griper Bay - reconnaissance surveys using Lambda. Included in this program will also be a survey of Robeson Channel, using Hi-Fix on the northern approaches.

(4) Tide Gauges

Permanent tide gauges at Port Harrison, Churchill Harbour and Cape Parry, whose installation was commenced in 1965, will be completed this season. Existing gauges will be serviced as outlined in the 1965 program.

(5) Charts

Eleven new editions of Charts of Arctic Canada are scheduled for publication in 1966.

(6) Sailing Directions

It is expected that new supplements to Volumes Two and Three of the Arctic Pilot will be ready for publication during 1966.

MINES BRANCH

Responsibilities Technical assistance for the development of mining and metallurgical industries in the North and for the development and utilization of petroleum and natural gas resources. Consulting advice and investigations on metals, metallic and non-metallic minerals, fuels, petroleum, natural gas, and industrial waters as related to northern development.

Long-term Plans

To continue technical assistance in developing mineral, petroleum, and natural gas resources in co-operation with industry, the Department of Northern Affairs and National Resources, and other branches of government.

Review of 1965 Operations

Metallic Ores

A processing investigation on a low grade iron ore from Wind River, Yukon Territories, continued. High grade hematite concentrates were produced by wet high-intensity magnetic separation. However, as this process may be too costly for the remote location, research is being directed to concentrating the ore by a more economical flotation process.

A shipment of two tons of iron ore from the Crest Exploration Limited property in N. Yukon Territory was crushed and concentrated by a heavy-media cyclone process. Samples of the concentrates were shipped to potential iron ore customers and consulting firms for evaluation of its smelting properties. The Branch is continuing to monitor this project.

The Branch is attempting to develop a treatment process for a gold-silver ore from Carmacks, Yukon Territory. The study on cyanidation and amalgamation has demonstrated that extremely fine grinding is necessary to free the gold for recovery processes. Laboratory study is in progress to determine if flotation concentration at coarse particle size followed by regrinding and further concentration would be more effective.

An investigation is in progress to recover cobalt from a sample from the Yellowknife area, Northwest Territories. While the sample is not sufficiently high in grade to be processed economically under present conditions, it is intended to accumulate sufficient technical data for this type of ore which could be applied to higher grade deposits in other locations in the north.

An investigation to develop a feasible process for an antimony ore from Wheaton River, Yukon Territories, was completed, and Investigation Report IR 65-74 has been issued. A flotation procedure was developed whereby 92.8 per cent of the antimony was recovered as a marketable grade of concentrate.

The development by Canada Tungsten Mines Limited of a scheelite producing mine in the Northwest Territories prompted the Mines Branch to initiate, in 1963, a project aimed at the development of an economical new method for the production of high purity tungsten oxide from the scheelite concentrate produced by this Canadian mine. At the present time, the Canadian produced scheelite is sold to foreign processors who use an old, established batch process, having several disadvantages, to refine it. The development of a new and simpler process might lead to the refining of the Canadian concentrates in Canada.

By the middle of 1965, the Mines Branch staff had developed on a laboratory scale a process, involving leaching and ion exchange methods, which promises to be a cheaper and simpler operation than the one currently in use by foreign processors for treating scheelite concentrates. One of the advantages of this new process is that it lends itself to continuous operation techniques. Work since the middle of 1965 has been directed towards the design and assembly of equipment needed to test the new process on a pilot plant scale.

In 1962 the Branch studied the various chemical methods that could be used to upgrade the scheelite concentrate by dissolving impurities such as calcite while leaving the scheelite unattacked. One of the methods studied was leaching the concentrate with an aqueous solution of sulphur dioxide; the optimum conditions for such a leaching procedure were determined. In 1965 Canada Tungsten Mines Limited hired a consultant to study the feasibility of using the sulphur dioxide leach procedure at the Company's mine in the Northwest Territories. Consequently, Mines Branch staff members were asked by the Company to assist and advise their consultant.

A Mines Branch staff member visited the following gold mines during 1965:

Giant Yellowknife Mines Ltd.
Consolidated Mining and Smelting Company of
Canada Limited - Con, Rycon and Vol Mines
Discovery Mines Ltd.
Tundra Gold Mines Ltd.

The representative discussed operating problems with the managers and mill superintendents of the operating mines, and was able to make a number of suggestions.

As in previous years, the facilities of the Mines Branch were made available for the Annual Meeting of the Canadian Gold Metallurgists, at which technical and operating experience relating to gold milling is exchanged among gold mill superintendents, and between the gold mill superintendents and Mines Branch staff. At the 1965 meeting, 75 per cent of the gold mines in Canada were represented.

Industrial Waters

A five-year sampling program of the Mackenzie and Yukon Rivers was continued. This project has now been extended to form part of the International Hydrologic Decade Program. Other studies were completed for the Geological Survey of Canada and the Arctic Unit of the Fisheries Research Board of Canada. A report on the chemical quality of waters in the Arctic Unit in the Northwest Territories is being prepared and will be published in the forthcoming year.

Fuels

Samples of bituminous sands from Melville Island received in 1964 from the Geological Survey were systematically analyzed to assist the geological interpretation of the genesis of the bitumen. This included determinations of the elements, functional groups and trace elements.

Ten samples from the Tantalus Butte mine, Yukon Territory, were received and a complete evaluation was made on the coking properties of the coal for metallurgical use.

One mine air sample was received from the Elsa Mine, Yukon Territory.

Mineralogical Analyses

A mill product of antimony ore from the Yukon Antimony Corporation undergoing beneficiation in the Mineral Processing Division was examined and evaluated. Some samples alleged to contain molybdenum were submitted for chemical analyses by the Geological Survey of Canada regional office at Yellowknife, Y. T.; they were examined in an effort to identify molybdenum-bearing minerals.

A sample of rock from the Northwest Territories, submitted by Crest Exploration Limited for the identification of valuable constituents, was evaluated.

Chemical Analyses

Chemical analyses were made on 23 samples for a total of 186 determinations. Of these, 3 samples and 3 determinations were for the Yukon (received from Northern Affairs and National Resources); 17 samples and 175 determinations were from the Northwest Territories (received from the Geological Survey of Canada).

The Use of Carbon- and Low-Alloy Steels at Low Temperatures

The first stage of a research program to study the effect of severe conditions of low temperature, difficult terrain, and heavy loading on rail wear for the Quebec North Shore and Labrador Railway Co. was completed. Some differences were observed in the mechanical and metallurgical characteristics of steel rails rolled in the years 1951 to 1962, and in the second stage an attempt will be made to correlate these differences with service performance.

Work has continued on the investigation of the notch toughness of structural steels at low temperatures, and on the effects of such factors as prior cyclic loading, pre-straining, heat treatment and the presence of sea-water. It has been found that certain combinations of these factors can raise the ductile-brittle transition temperature by as much as 80°C (144°F).

The development of new and improved steels for use at low temperatures is also in progress. The addition of 0.03% niobium to a carbon-manganese steel was observed to lower the transition temperature significantly when the steel was normalized. Various compositions of a copper-nickel steel were examined at strength levels up to 150 kpsi by means of drop weight and explosion bulge tests. The toughness of these low-alloy steels at low temperatures increases their potential for northern applications.

The work on the welding of structural steels at temperatures down to -60 F has been extended in terms of materials and testing methods. Welding may be continued at very low temperatures, provided that proper precautions are taken. Work has continued on the weldability and notch-ductility of Canadian Standard Association G40.8 Grade B steel using electrogas welding. The notch-ductility of the welded joints appears satisfactory on the basis of results so far, using various means of assessment including explosion bulge testing.

Plans for 1966

Technical and scientific services will be provided for assisting in the opening of new mines, for increasing mineral production in the Territories, and for solving production problems of petroleum and natural gas. Scientific advice will be available and investigations will be undertaken as required on northern problems related to metals, minerals, fuels, petroleum, natural gas, and industrial waters.

OBSERVATORIES BRANCH

SEISMOLOGY DIVISION

Responsibilities The Division of Seismology operates seismic observatories at Alert, Mould Bay, Resolute, Coppermine, Frobisher, Yellowknife, Baker Lake, Great Whale River, Schefferville, and a large seismic array near Yellowknife. The seismicity of the Arctic is studied, and research conducted on teleseisms recorded there. In co-operation with the Polar Continental Shelf Project, crustal seismic refraction studies are undertaken. Geothermal research is also carried out.

Long-term Plans

The Division of Seismology intends to construct first order seismograph stations at Churchill and Inuvik, and a second order station for local seismicity studies at Whitehorse. The Division intends to calibrate the seismic array at Yellowknife and to investigate other seismic recording techniques in order to facilitate scientific analysis. The Division will continue its geothermal research in boreholes abandoned by oil companies.

Review of 1965 Operations

The seismic stations listed above operated continuously as did the seismic array. New stations at Baker Lake and Great Whale River were commissioned during the year.

Crustal soundings were made in the Western Arctic Archipelago in co-operation with the Polar Continental Shelf Project. Attempts were made to unblock the deep hole at Resolute for geothermal purposes. These attempts failed.

Two crustal stations were occupied for the Hudson Bay crustal shoot. This work was done in co-operation with the Geological Survey of Canada.

Plans for 1966

The seismological observatory program will be continued and a vault will be built at Churchill. The Yellowknife Array will be calibrated and the same experiment will be combined with a large crustal shoot and teleseismic experiment. Twenty-eight tons of dynamite will be used by seven temporary Government of Canada recording parties. Geothermal research is planned on two or three holes in the Mackenzie District and Yukon Territory.

GRAVITY DIVISION

Responsibilities The Division of Gravity obtains gravity data for use in geodetic research problems and for studies of regional as well as localized crustal features. Gravity data are used in geodetic research to assist in determining the size and shape of the earth and are currently of interest to the Department of National Defence. They are interested in the problem of long-range rocket and missile trajectories which vary slightly with variations in gravity. Gravity data, with interpretations, are provided as a service to the oil and mining exploration industries.

Long-term Plans

During the next decade, regional gravity coverage at a station spacing of six to eight miles should be completed over most of the northern areas of Canada including the inter-island channels of the Arctic Archipelago and a large part of the Polar Continental Shelf. Where possible, local anomalous areas will be investigated in detail. In general, the analysis and interpretation of the data obtained from the regional surveys will be presented as preliminary reports which will accompany issues of the Gravity Map Series of the Observatories Branch.

Review of 1965 Operations

1. Polar Continental Shelf

Regional gravity surveys were carried out in co-operation with the Polar Continental Shelf Project. Approximately 750 regional stations

were observed at intervals of six to eight miles over Somerset and Prince of Wales Islands as part of a geophysical investigation of the Boothia Arch and neighbouring sedimentary basins. The interpretation of this work is being carried out by Mr. A. Berkhout as part of his graduate studies at Queen's University.

Approximately 500 gravity observations were made on the sea ice of the Arctic Ocean and the Ballantyne Strait. This work included a traverse of 230 miles long extending northwest from Cape Andreasen on Prince Patrick Island. The long traverse over the ocean was expedited by the use of a Bell 204B turbine engine helicopter in conjunction with the standard S-55 helicopter. Seismic techniques were employed in order to record water depths beyond the range of the conventional echo sounder. The measurements, which were observed at intervals of 20 miles, provided information over the continental margin and slope out to the beginning of the Arctic Ocean where water depths greater than 3000 meters were recorded. Interpretation of the gravity results over this continental shelf area is being carried out by Dr. J.R. Weber and Mr. L.W. Sobczak. A comprehensive and structural interpretation of all gravity data for the Queen Elizabeth Islands is currently being done by Mr. L.W. Sobczak.

The Division of Gravity maintains that no other Continental Shelf has been mapped and studied as intensively as the Canadian Polar Continental Shelf.

2. Hudson Bay

Under the direction of Mr. A.K. Goodacre and Dr. J.R. Weber, the Gravity Division carried out an oceanographic and geophysical program in co-operation with the Bedford Institute of Oceanography and the Geological Survey of Canada. The Division carried out a reconnaissance gravity survey of Hudson Bay. Two underwater gravimeters were used to make observations on the floor of the bay at 297 stations. The ship employed was the C.S.C. Hudson. Four hundred and ninety-four stations were established through the use of the M.V. Theron. While the station distribution is not uniform, a number of traverses with observations every eight to ten miles, the general coverage is good with the exception of the area immediately north of James Bay and east of the Belcher Islands. The underwater gravimeter observations were supplemented in some

areas by measurements obtained from a surface sea gravimeter. The results and preliminary analysis of this work in Hudson Bay are being prepared for publication in the Gravity Map Series. A more complete interpretation including gravity data for the adjoining land areas is also underway.

3. Application to Glaciology

Under the direction of Dr. J.R. Weber, preliminary work was carried out over the Penny Ice Cap in 1962. The program aimed at finding out whether repeated gravity measurements are useful in determining long-period fluctuations in the elevations of ice caps. During April and May, 1965, gravity and related survey work on this program were resumed. In addition, comparative ice thickness determinations were obtained through the use of gravity, radar, seismic and resistivity techniques. Dr. Pierre Andrieux, who was in charge of the resistivity work, made additional measurements to determine the fundamental properties of glacial ice on Meighen and Axel Heiburg Islands.

4. Control Surveys

The gravity control station network was strengthened by an extension of the Eastern American Calibration Line from Montreal to Alert. This work was done in co-operation with a party of United States observers. This line includes Chimo, Frobisher, Hall Beach, Resolute Bay, Eureka, Alert and Thule.

Plans for 1966

1. Polar Continental Shelf

Regional gravity mapping will be continued on Brodeur Peninsula, the Admiralty Inlet area, and on the ice between the islands. Gravity mapping of the Polar Continental Shelf will continue within the range of the Decca navigation chain.

2. District of Mackenzie

Regional gravity mapping will be extended to the area north of Great Slave Lake to the southern portion of Victoria Island. This work will include most of the Bear and Slave Geological Provinces.

3. Penny Ice Cap

In March, 1966, a small party under the direction of Dr. J.R. Weber, will continue the quantitative survey of this important glaciological feature.

GEOMAGNETISM DIVISION

Responsibilities The Division of Geomagnetism measures and charts the magnetic field of the earth, operates a network of magnetic observatories, and conducts research into the structure of the earth's crust by geomagnetic methods.

Long-term Plans

The Division of Geomagnetism intends to re-occupy magnetic repeat stations at three to five year intervals; to carry out three-component airborne magnetic surveys at five to ten year intervals; to operate permanent and temporary magnetic observatories.

Review of 1965 Operations

Ten magnetic stations in the Districts of Franklin, Mackenzie, and Keewatin were occupied to determine the secular change of the geomagnetic field. Magnetic observatories operated continuously at Alert, Mould Bay, Resolute Bay and Baker Lake. A portable magnetotelluric station recorded on Cornwallis Island. Seven measurements of heat flow were made in the vicinity of Mould Bay. At this location operations were carried on from the sea ice in a continuing study of anomalous magnetic induction.

Plans for 1966

The Division of Geomagnetism intends to re-occupy nine magnetic stations in the District of Mackenzie. The four present stations will

continue operating. Five temporary magneto-telluric stations will be set up on Ellesmere Island east of Lake Hazen. Other magneto-telluric observations will be made at Alert.

POLAR CONTINENTAL SHELF PROJECT

Responsibilities To carry out a long-term investigation of the continental shelf lying to the north and west of the Canadian Arctic Archipelago and of the waters above it, together with the islands of the archipelago where relevant, and the straits and sounds between the islands. The investigation is to comprise mainly those fields of survey and subjects of research for which the Department of Mines and Technical Surveys is responsible in other parts of Canada, wherever such study is not more economically and efficiently pursued as a separate self-contained operation; but it is also designed to include or to support worthwhile researches in fields outside those normally supported by the Department, if such researches could not otherwise be carried out.

Long-term Plans

The field survey and research phases of the Project will eventually cover all the Canadian sector of the Arctic continental shelf of North America, those parts of the Arctic Ocean basin that are of interest to Canadian investigators and which can be reached with available logistics resources, and all parts of the Arctic Archipelago not investigated by other agencies in the particular fields of interest covered by the Project. From 1959 to 1965 work has been concentrated in the region between Meighen Island and Prince Patrick Island, extending about 250 kilometres out to sea and the same distance back into the archipelago; but individual programmes of survey and research have been carried out throughout all the Queen Elizabeth Islands, and extended to Banks Island in the southwest and northern Greenland in the northeast. As the area of intensive systematic survey moves to the southwest, along the Arctic Ocean front, at a rate of about 150 kilometres per year, it is expected that a greater portion of the specialized researches will be carried out at widely separate places throughout the region, in whatever locality the problem is best studied. The Project therefore will expect

to maintain a central base of operations in the field, scattered sub-bases as necessary, and an extensive logistics and communications system, ranging throughout the Archipelago and adjacent ocean, to support widely scattered activities.

Review of 1965 Operations

Field work was co-ordinated mainly from Mould Bay, on Prince Patrick Island. Parties totalling 96 persons were engaged in investigating the central section of the arctic continental shelf and the adjacent islands and straits. Supporting activities connected with transport engaged about thirty people in addition to those directly on the field operation

The operations in 1965 ranged more widely through the Arctic than in preceding seasons, due to an increased emphasis on co-operative work with other agencies and a consequent diversity of investigations, to the employment of a long-range high-performance helicopter, and above all to better than average weather throughout the field season.

In addition to the Department of Mines and Technical Surveys, the following agencies were involved in the 1965 programme of the Polar Continental Shelf Project:

Department of Agriculture (Plant Research Institute)
Department of National Defence (Defence Research Board)
(Royal Canadian Navy)
Department of Transport (Meteorological Branch)
Dartmouth College
University of Liege (Belgium)
McGill University
University of Ottawa
University of Paris
Arctic Institute of North America
U.S. Army Natick Research Laboratories (Polar and Mountain
Laboratory)

One commercial company, Petropar Canada Limited, also took part in some of the Polar Continental Shelf Project field operations, under an approved arrangement, in connection with its own programme of investigations.

The following is a summary of the work done in the major scientific fields:

Geology, Marine

The programme in submarine geology has been designed to provide information on the character and stratigraphy of the sediments on the floor of the seas surrounding the islands of the archipelago, and covering the continental shelf, and continental slope. Samples were collected from the continental shelf and continental slope offshore from northern Prince Patrick Island and studied in the laboratory for evidence of their age, source, conditions of transport and sedimentation, and indications of change in sea level and variations in climate in the geologically recent past.

Geology, Terrestrial

The Polar Continental Shelf Project provided certain logistic support and field facilities to parties of the Geological Survey of Canada and the Groenlands Geologisk Undersøkelse in northern Ellesmere Island and northwestern Greenland; to a party from Dartmouth College studying the late Precambrian rocks on Victoria Island; to a party from the University of Ottawa carrying out various geological investigations on Somerset Island; and to studies, sponsored by the Arctic Institute of North America, of the geology in the vicinity of the Mould Bay seismological stations.

Geomagnetism

Field tests were made near Resolute of newly-developed transistorized geomagnetic and magneto-telluric equipment. Another party studied the effect of geomagnetic latitude on the rate of standard chemical reactions, and the apparent filtering or shielding effect of a crystalline ice layer, in the Meighen icecap, on the geomagnetic or electromagnetic forces that affect chemical reactions.

Glacier Physics and Glaciology

The thermal coring drill was set into operation on Meighen Icecap and drilled a hole completely through the icecap at its apparent thickest point, with full recovery of cores. Instrumentation was set in the hole for a detailed vertical thermal profile, and the hole diameter was carefully logged throughout the length of the hole as the first of a series of measurements to determine the strain rate. The electrical resistivity of the icecap was measured in three dimensions using electrodes in the hole and spread on the surface.

Detailed observations were made of short-period fluctuations in resistivity of the ice, which are unconnected with measurable local or environmental conditions and which may be due to extra-terrestrial influences.

Routine glaciological measurements were continued on the Meighen and Melville Island icecaps, and the survey control on Melville Island improved in preparation for low-altitude aerial photography. Logistic support was provided for research programmes by a university on the glaciers of Axel Heiberg Island and by the Arctic Institute of North America on Devon Island.

Special glaciological-topographical maps of Meighen Island and Meighen Icecap, on scales 1:100,000 and 1:50,000 respectively, were published.

Gravity

The regional gravity survey was continued to cover the continental shelf and continental slope offshore from Prince Patrick Island, and over Hecla and Griper Bay and adjacent areas north of Melville Island. A long gravity profile was extended down the continental slope into the Canada Basin to a water depth of 3,100 metres. The base loop network was expanded to cover Somerset Island, Prince of Wales Island, and a regional gravity survey started in this and adjacent areas.

Heat Flow

Geothermal heat flow measurements were made southwest of Prince Patrick Island and in the channels between Prince Patrick Island and Melville Island to the east, as part of a further investigation of the geomagnetic and seismic anomaly in the area. Earlier measurements of abnormally low heat flow south and west of Prince Patrick Island appear to be confirmed, but the observations do not throw light on the cause or nature of the anomaly.

Historical Investigations

A brief examination was made of two areas in eastern Queen Maud Gulf that appeared to be likely to contain the remains of one Sir John Franklin's ships, lost in 1847. A few hydrographic traverses were made, and a small area surveyed in detail with a magnetometer. A small magnetic anomaly was shown on calculation to be caused by a source too deep to be iron parts from a ship; this was corroborated

by shallow drilling through the ice. Pieces of wood and metal from an Admiralty ship of the early nineteenth century were however found on shore in the vicinity.

Hydrographic Survey

The bathymetric survey of the continental shelf and slope, and of the straits and sounds between the western Queen Elizabeth Islands, was continued, with through-the-ice sounding on a grid spacing of 7 to 10 kilometres over about 35,000 square kilometres of the Arctic Ocean offshore from Prince Patrick Island and within the archipelago north and west of Melville Island. Decca Lambda position control was used. This work will be for publication on a scale of 1:500,000. The standard hydrographic survey of Cardigan Strait, with adjacent parts of Norwegian Bay and western Jones Sound was completed, for publication on a scale of 1:50,000, using helicopter-towed echo sounding equipment and Hi-Fix control. Further preparations were made for systematic hydrographic surveys in the Nares Strait-Lincoln Sea area. Minor hydrographic work was done in Queen Maud Gulf and at Mould Bay, and assistance given to a university research party engaged in limnological investigations on Somerset Island.

Periglacial Studies

A detailed study was started of the periglacial features of the Arctic coastal plain and adjacent parts of Prince Patrick Island. Pingo-like forms, sand dunes, raised and dissected deltas, and scarps were investigated as to their structure, mineral and textural composition, and method of formation.

Resistivity Studies

Measurements were made of the resistivity, in three dimensions, of the large ice mass below its pressure-melting point, using the bore hole on the Meighen icecap (v. glacier physics). The fluctuations of resistivity with time were measured, and compared with observed environmental conditions. Some short-term fluctuations in resistivity were not apparently coincident with meteorological, magnetic, or solar variations, and their cause and nature warrant further study.

Sea Ice Surveys

Systematic patrols were made of all major waters of the Queen Elizabeth Islands and of the adjacent Arctic Ocean and Parry Channel, throughout the season of significant sea ice activity. Information was collected on the nature, break-up, amount, distribution, dispersal, and formation of the sea ice and certain tabular icebergs or "ice islands". It has proved possible to follow the movement of the same ice throughout the season and from year to year. The continuation of these surveys for a number of years is beginning to show the range of variations and apparently significant consistencies in sea ice nature and movement from year to year. Information is collected relating the behaviour of the ice to meteorological and oceanographic factors; this, it is hoped, will lead to a better understanding of the causes and controls of sea ice development and movement and thus, in turn, to better forecasts of ice conditions.

Seismic Surveys

Seismic refraction traverses were run from Prince Patrick Island southeastward through Ballantyne Strait and Hecla and Griper Bay to Melville Island and across that island and Viscount Melville Sound to Elvira Island. Explosions set off on this traverse were also recorded at Mould Bay. The work is part of a long-term investigation of the crustal conditions and deeper sedimentary structures under the west end of the Sverdrup Sedimentary basin.

Soils and Mass Wastage

A quantitative and qualitative study of mass wastage in the Arctic environment was carried out on Prince Patrick Island and on Ellef Ringnes Island, with electrical measurement of soil movement, and observations of the relation of the effect of precipitation and the development of the thawed layer on the various physical characteristics of bulk soil, and of the influences of slope, direction of exposure, late snow banks and vegetative cover on soil movement.

Sub-ice acoustics

Logistic support and field facilities were provided for a programme of investigation of the characteristics of the transmission of sound under unbroken pack ice over deep water, offshore from Prince Patrick Island.

Topographic and Geodetic Surveys

Location surveys were completed for the establishment of the Decca Lambda survey and navigation chain to cover M¹Clure Strait. Surveys were run to provide additional ground control for future aerial photography, and to record current glacier movement, in the icecap area of Melville Island. Glaciological surveys were carried out on the Meighen Icecap. Further preparations were made for precise geodetic surveys between Ellesmere Island and Greenland across Robeson Channel. Control surveys were run from Ballantyne Strait to Melville Island at the head of Hecla and Griper Bay, to provide the positions of the stations on the seismic traverses. In addition, elevations and reference azimuths were determined at the sites of certain meteorological and upper-air tracking equipment, and local engineering and airport surveys made, at the request of the Department of Transport.

Plans for 1966

Field work will be continued in all of the major activities of 1965, with the exception of the seismic surveys, which will be suspended pending interpretation of the data already gathered and completion of related work on the arctic mainland.

An aeromagnetic survey is planned for the continental shelf and slope west of the south end of Prince Patrick Island, covering part of the approaches to M¹Clure Strait, and extending inland across Crozier Channel and Kellett Strait.

Increased long-range field transport capability will be provided, by turbine-powered helicopters and fixed-wing aircraft, and will be used to extend the submarine geology, gravity, and hydrographic work farther out to sea and down the continental slope.

It is expected that the first phase of the study of ice physics on the Meighen Icecap will be completed. New large-scale air photography will be undertaken of the icecap area of Melville Island.

Systematic hydrographic surveys will be started in the Robeson Channel area. The first precise geodetic survey linking Ellesmere Island with Greenland should be completed.

Other investigations will be mainly direct extensions of those of 1965. Minor investigations outside the direct responsibilities of the Department of Mines and Technical Surveys, and co-operative work with other groups engaged in scientific studies in the area, will be undertaken or supported as circumstances warrant.

The field work is expected to engage a total of about 90 men, including personnel under contract and crews of supporting aircraft. Aerial transport in the field, including that under Project contract management but assigned to work carried out by or directed by other agencies of the Department of Mines and Technical Surveys, will be provided by two Bell 204B helicopters, two Bell 47G4 helicopters, one Sikorsky S-55 helicopter, two deHavilland DHC-3 Otter, one deHavilland DHC-2 Mark III Turbo-Beaver, one Douglas DC-3, and one Beechcraft D18S aircraft, with larger freighter aircraft as required. Ground transport includes six tracked and wheel vehicles and about 12 motor toboggans and small amphibious vehicles. The central base camp will be at Mould Bay; new camp facilities will be built on northeastern Ellesmere Island, and additional established or semi-permanent facilities will be operated at Resolute, Hell Gate, Meighen Island, Brock Island, Melville Island, and the seaward coast of Prince Patrick Island. At the end of the 1966 field season it is planned to move the Decca Lambda survey and navigation system to give coverage of M'Clure Strait and the ocean to the west.

SURVEYS AND MAPPING BRANCH

Responsibilities To carry out all geodetic, topographic, and legal surveys, and to produce topographical maps and aeronautical charts required for administration, development, and defence purposes.

Long-term Plans

Geodetic Control

To extend horizontal and vertical control as developments warrant and facilities permit, and to obtain data from astronomic observations for investigations of the size and shape of the earth. In the Robeson Channel area a long term investigation will be conducted to determine if there is relative crustal movement between Greenland and Ellesmere Island.

Mapping

To complete topographical coverage at 1:250,000 by 1967; to provide 1:50,000 and, if necessary, larger scale mapping of major routes of travel and other areas of economic importance or development; to revise air chart bases as better information becomes available.

Aeronautical Charting

To revise the portrayal of aids to air navigation on aeronautical charts and pilots handbooks and other air information publications, and to produce new aeronautical charts as required.

Legal Surveys

To manage and execute surveys made to enable land or resource transactions involved in the administration and development of public or other lands.

Review of 1965 Operations

Geodetic Control

The triangulation arc extending south from Rankin Inlet was completed

to the 60th parallel. Astronomic control was established at station Maguse near Eskimo Point, and observations to determine deviation of the vertical were taken at five other stations in the arc. A party of five men worked with a large Topographical Survey party engaged in establishing Aerodist connections between Quebec and Baffin Island to the north, and between Quebec and Southampton Island to the west. The Branch co-operated in two Joint Canadian-U.S. operations; the Mount Kennedy Survey and the Satellite Triangulation Project. In the Yukon Territory, two staff members worked on the Mount Kennedy survey which consisted of a five course precise traverse connecting existing surveys near Kluane Lake with existing surveys in U.S. territory near Yakutat Bay. In the course of the survey the position and elevation of Mount Kennedy were determined. Satellite triangulation stations were established at Whitehorse, and Cambridge Bay late in 1964 and at Frobisher Bay in September, 1965. The Whitehorse and Cambridge Bay stations were active from the first of the year to mid-March. The Cambridge Bay and Frobisher Bay stations have been active since September. Two staff members are assisting in the operation of the Frobisher Bay station.

Topographical Mapping

Field Work

- (a) Aerodist trilateration nets were established in cooperation with the Geodetic Survey from Ungava to Baffin and Southampton Islands. Supplementary control was at the same time obtained for mapping a number of islands in Hudson Bay at the 1/250,000 scale.
- (b) Control was established for mapping 67 sheets at the 1/50,000 scale in central Yukon.
- (c) Control was established for mapping 39 sheets at the 1/50,000 scale at the Baffinland iron prospect on Baffin Island.
- (d) Special surveys were made to locate eleven radio aids to navigation and for large scale plots of northern settlements at Mary River, Milne Inlet, Katiktok Lake, Pond Inlet, Pangnirtung, Broughton Island and Mould Bay.
- (e) Assistance was given to the Polar Shelf Project, Dominion Observatories and Defence Research Board on seismic and glaciological surveys on Baffin, Ellesmere and western Parry Islands.

Map Compilation

- (a) Twenty-seven sheets in the Arctic Islands and eight sheets containing islands in Hudson Bay and Hudson Strait were completed for publication at the 1/250,000 scale.
- (b) Sixteen sheets were completed for publication at the 1/50,000 scale: twelve at the Baffinland iron prospect, three of Meighen Island and one in the Yukon.
- (c) One sheet at Whitehorse, Y.T. was completed for publication at the 1/25,000 scale.
- (d) Special plots were made of areas of interest at Broughton Island, Clyde River, Igloolik, Meighen Island Icecap, Resolute airstrip, Baker Lake, Rae and Wrigley. Preparation was done for large-scale plots to be completed by contract, of settlement areas at Pangnirtung, Pond Inlet, Hay Camp, Reindeer Station, Pine Point, Teslin, Michie Creek and Mayo.

Aeronautical Charting

Aeronautical information was revised for existing aeronautical charts and publications as required for civil and military use. Topographical information was revised on four 1:500,000 charts and one 1:1,000,000 chart. The Enroute High Altitude series of charts has been extended over the whole of northern Canada. A combined plotting/planning chart covering from Alberta to Germany and extending over northern Canada has been produced.

Legal Surveys

Yukon Territory - A 77-lot subdivision, two parcels and a right-of-way were surveyed at Watson Lake. At Ross River, four parcels and a 48-lot subdivision were surveyed together with a co-ordinate system to control future surveys. At Dawson the survey of the Stewart Crossing - Dawson Road was completed by surveying a bridge site and rights-of-way through two lots. Eleven miscellaneous parcels were surveyed at Porter Creek, Tagish, MacRae, Whitehorse, Haines Junction, and various locations along the Alaska Highway. A relocation of the Alaska Highway was surveyed at mile 849. An investigation was made to determine the size of a gross error in the bearings shown on an old plan of mineral

claims near Carmacks.

Northwest Territories - A group lot right-of-way, and a 14-lot subdivision were surveyed at Fort Simpson. Individual lots were surveyed at South Nahanni and Tuktoyaktuk. At Holman on Victoria Island a 109-lot subdivision was laid out. Approximately 45 new lots were created at Inuvik by the subdivision of four blocks in the townsite. A second party surveyed three subdivisions totalling 355 lots at Coral Harbour, Whale Cove, and Eskimo Point. Two other subdivisions, at Pond Inlet and Pangnirtung, were surveyed by a private survey firm under contract.

Plans for 1966

Geodetic Control

A triangulation arc will be started in the vicinity of the 60th parallel near the Hudson Bay coast. This arc will be extended to the west to connect with existing triangulation near Selwyn Lake. Astronomic control will be established along this arc. A small party will locate and prepare station sites for a small "crustal movement" network which will connect Greenland and northern Ellesmere Island in the vicinity of Robeson Channel. This party will obtain support from the Polar Continental Shelf Project. Activities will continue at the satellite triangulation stations at Cambridge Bay and Frobisher Bay until about mid-March.

Topographical Mapping

- (a) Control surveys are proposed for mapping 175 sheets at the 1/50,000 scale in the southern part of the Yukon.
- (b) Assistance will be given to other organizations in surveys among the Arctic Islands.

Map Compilation

Eighteen sheets in the Arctic Islands are scheduled for completion at the 1/250,000 scale along with 75 sheets at the 1/50,000 scale on Baffin Island, Taltson Lake, Liard and Mackenzie rivers and Mayo. Another sheet at the 1/25,000 scale will be completed at Whitehorse. Special large scale plots will be made as required and material will be prepared

for similar plotting by contract for an estimated fifteen settlements.

Aeronautical Charting

Aeronautical information in existing aeronautical charts and publications will be revised as required. Topographical information will be revised as new large-scale mapping becomes available.

Legal Surveys

Yukon Territory - Official requests for surveys have not yet been made. However from preliminary information it appears that there will again be need for a number of surveys for the purpose of sale or reservation of lands relating to public campgrounds, subdivisions, airstrips, fire lookout sites, etc. A resurvey of Hydraulic Mining Lease No. 1 (Anderson Concession) near Dawson will be undertaken. It is expected that this survey and others yet to be scheduled will require one survey party for the summer months.

Northwest Territories - As in past years surveys are required in connection with the administration and development of towns and settlements and lots for use of various government agencies principally the Department of Northern Affairs and National Resources. Numerous miscellaneous lot surveys and subdivisions (new and additions) are being requested for various settlements along the Mackenzie River. Included in those is a 100-lot addition to the Inuvik Townsite. About 13 settlement subdivision surveys in the north-eastern part of the Territories will be requested. It is tentatively planned that the majority of these will be surveyed under contract by two or more private survey firms. The surveys will require one Departmental survey party in addition to the contracting firms.

DEPARTMENT OF NATIONAL DEFENCE

CANADIAN ARMED FORCES

Responsibilities Support of Canada's external and defence policies in the North by contributing to the maintenance of Canadian sovereignty in the Arctic.

All aspects of maritime, land and air defence of the North. In some areas of the North, these tasks are done in cooperation, or shared, with the U.S.A. under joint agreement.

Defence mapping of the North in cooperation with the Department of Mines and Technical Surveys.

Provision of Search and Rescue Services and Assistance to other Government agencies in areas where normal commercial services are not available.

Conduct of research into the problems of Arctic communications techniques and equipment.

Long-term Plans

Continuation of present activities. Responsibilities and resources available to meet anticipated commitments and defence problems of the North are the subject of a continuing review.

Review of 1965 Operations

Maritime Forces

No RCN ships operated in Arctic waters in 1965.

Two RCN Clearance Diving Teams, one in the Eastern and one in the Western Arctic, assisted the Department of Transport in resupply of DEW Line sites. In addition, a special team was employed in the deep arctic in assisting the Department of Mines and Technical Surveys in seismological work during January and February 1965.

Land Forces

Except for mapping, and apart from reconnaissances and visits to the North, there were no significant operations or exercises by the Land Forces in 1965. However, it should be noted that the 2nd Battalion of the Royal Canadian Regiment took part in an exercise with the U.S. Army in Alaska from 18 January to 15 February, 1965.

Research and Communications

Research and studies on radio transmissions and reception problems were continued at Frobisher Bay, Alert, Inuvik and Whitehorse. In addition to its normal activities, the station at Frobisher Bay provided communication support to the seasonal DEW Line resupply operations. At Alert, the provision of water and sewage distribution facilities was completed in 1965.

Army Survey Establishment

A survey of the Arctic coast, from Liverpool Bay east along the Arctic coast to Coppermine, was carried out in two phases:

Phase 1 - Roving Deposit 6-24 Apr. This was a joint RCAF - Army operation carried out to pre-position gasoline, food and survey stores for the summer operation. A C130 and a DC 3 aircraft were used to stock five camps and twenty gasoline caches.

Phase 2 - Survey Operation 29 May - 10 Aug. The survey was carried out using two survey teams and three Bell G-4 helicopters. 1800 miles of tellurometer traverse and 1500 miles of altimeter traverse were completed to provide horizontal and vertical survey control for 55 maps at a scale of 1:50,000 covering approximately 20,000 square miles.

Preliminary survey work and preparation was carried out in the Great Slave Lake Area, from 25 Jul to 19 Sep, for an aerodist survey operation which will provide control for 1:50,000 mapping covering communication routes in the area. It is planned that the aerodist survey will be carried out in 1967 as a joint operation with the Department of Mines and Technical Surveys.

Support was provided for the U.S. Coast and Geodetic Surveys at Cambridge Bay and Frobisher Bay in carrying out their satellite

triangulation programme. In this programme a network of ground stations throughout the world will be fixed by observations to satellites.

Air Forces

Roving Deposit. Two ski-wheeled Dakotas from 102 KU airlifted 86,400 lbs of POL and supplies in 30 sorties from Cape Parry to several cache sites in the area for the Army survey team. The exercise commenced 12 Apr but due to rough weather was not completed until 24 Apr. The Dakota flying time (both transit and operational) was 60 hours. A Hercules aircraft was used to carry personnel and support spares to Cape Parry prior to Dakota operations. On completion of Roving Deposit a Dakota was moved to Eureka to airlift 40,600 lbs of POL and supplies to Tanquary Fiord and Hazen Lake for DRB geophysical research personnel. This latter operation commenced 1 May and was completed 8 May. Flying time (both transit and operational) was 69 hours and 21 sorties were flown.

Spring Resupply and Bostop Phase 1. Two Hercules aircraft distributed 1,370,000 lbs of (Petrol, Oil and Lubricants) and general cargo from Resolute Bay to the Joint Arctic Weather Stations and 2,500,000 lbs of POL from Thule to Alert between 19 Apr and 2 May. During the peak of the operation the aircraft were operating $16\frac{1}{2}$ flying hours each per day. The total flying time for the entire operation was 449 hours.

Operation Bostop. Two Hercules aircraft lifted 1,017,200 lbs of general cargo and 529,859 lbs of fuel oil from Thule to Alert between 23 to 29 Jul. This amounted to some 31 cargo trips and to 17 trips carrying bulk fuel. A total of 194 flying hours were required.

Fall Resupply. Two Hercules aircraft carried approximately 415,000 lbs of general cargo from Resolute Bay to the Joint Arctic Weather Stations during the period 12 Sep to 15 Sep. Total flying time amounted to 84 hours.

Christmas Airdrop. One Hercules aircraft was employed from Nanao during 6 Dec. to 9 Dec to airdrop mail and other items to 22 points in the Arctic. The total weight of the baggage carried including paniers and other equipment was 21,511 lbs.

Search and Rescue. Five major searches were conducted in the North during 1965 with an expenditure of 164 flying hours. All five searches were for missing aircraft. In addition numerous mercy flights were carried out.

Survival Training. Arctic survival training was conducted at Resolute Bay during the winter months. In addition to RCAF trainees, a number of representatives of foreign Services and civilian organizations such as the U.S. Navy, RCMP, NA & NR, and DOT took part. An average of 30 personnel attended each of the six courses conducted.

Plans for 1966

The Canadian Armed Forces will continue to support other Government Departments in scientific and technological research programs. Communications assistance will be provided in support of the DEW Line resupply. Construction will be undertaken at Inuvik to extend and improve accommodation and recreational facilities.

RCN Clearance Diving Teams. Will be made available to provide assistance in DEW Line resupply.

Army Survey Establishment will continue support of the U.S. Coast and Geodetic Surveys Satellite Triangulation Programme.

Airlift for resupply of the Arctic will be provided by C130 Hercules aircraft. The Spring and Fall Resupply operations to the JAWS sites and Exercise Boxtop (the resupply of Army and DOT at Alert) will comprise a total airlift of approximately 2500 tons of bulk fuel and general cargo. In addition it is planned to operate a C130 weekly as a scheduled flight from Namao - Resolute - Alert - Thule and return. A scheduled flight from Namao - Whitehorse - Inuvik and return twice monthly will also be continued.

Search and Rescue operations will be conducted as necessary.

Arctic Survival Training will be carried out during the winter months from Resolute.

DEFENCE RESEARCH BOARD

Responsibilities To bring scientific knowledge and experience to the assistance of the Armed Services in solving problems of military operations in high latitudes. To sponsor and undertake research and technical projects of particular assistance to the Armed Services.

Long-term Plans

Research projects of two main types will be conducted: basic studies in the laboratory, and applied studies or field investigations. Almost every aspect of science is involved, with emphasis on factors, particularly cold, affecting the behaviour of man and his machines, and the physical sciences affecting communications, movement, and navigation in and under the sea, on land, in the air, and in outer space.

Review of 1965 Operations

The Defence Research Board conducted research projects on arctic and cold-weather problems through its Physics, Weapons and Engineering, and Biosciences directorates at Ottawa, the Defence Research Northern Laboratory at Fort Churchill, the Defence Research Telecommunications Establishment at Ottawa, the Prince Albert Radar Laboratory, the Defence Research Medical Laboratories at Toronto, the Pacific Naval Laboratory at Esquimalt, the Naval Research Establishment at Dartmouth, and the Canadian Armament Research and Development Establishment at Valcartier. It also supported and coordinated research in the north by means of grants and contracts to universities, government agencies, and non-government research organizations. Close collaboration was maintained with research and development agencies in the United States and Britain.

Defence Research Northern Laboratory

The Defence Research Northern Laboratory was closed down in June 1965 and the facilities transferred to the National Research Council.

Radio Physics

The telemetry station at Resolute Bay continued to record data from the Alouette I topside sounder satellite during 1965. This satellite completed three years of operation in September, and all experiments continue to function well. Data from the U.S.-built topside sounder, S-48, were also collected by the Resolute Bay station during the year.

Prior to the launching of Alouette II in November, 1965, a considerable amount of additional equipment was installed at Resolute Bay, to permit simultaneous recording of data from two satellites. This was necessary as Alouette II was launched simultaneously with, and in the same orbit as, another satellite (Explorer XXXI) which collects data that is complementary to the Alouette II data, and must be recorded at the same time.

Operation of the Telemetry station is by D.O.T. personnel; the number has been increased during the year from four to six because of the extra work load. One man is also supplied by DRTE for maintenance purposes.

Studies of the lower ionosphere were continued in the Canadian Arctic during 1965. Recordings of the variations in amplitude and phase of low frequency (LF) transmissions from several transmitter sites were recorded at Fort Churchill. In addition, several very low frequency (VLF) transmissions were recorded at Fort Churchill, as a cooperative service to the U.S. Naval Electronics Laboratory, San Diego, and the Bedford Institute of Oceanography. The high-power, high antenna gain, fixed frequency "partial-reflection" sounder, which was installed at Resolute Bay in 1963, continued in operation during 1965. The data from this sounder was supplemented in the spring of 1965 by the installation of similar equipment at Fort Churchill (operation at Ottawa has continued since the autumn of 1961). This experiment has proven to be one of the most valuable means of studying the lower ionosphere by ground based experiments. A successful rocket experiment was conducted at Fort Churchill in May, 1965, for the purpose of comparing data obtained by the partial reflection experiment with those obtained by several independent experiments conducted in the rocket.

The chain of riometer (relative ionospheric opacity meter) stations continued in operation. These radio receivers, operating on a frequency of 30 Mc/s, measure the changes in the intensity of extra-terrestrial radio noise, and provide a valuable routine monitor of changes in radio-

wave absorption in the lower ionosphere. Northern riometer stations are operated at Resolute Bay, Fort Churchill, and Moosonee. Recordings are also made at the NRC field laboratory at Great Whale River for the Institute for Telecommunication Sciences and Aeronomy, Boulder, Colorado. DRTE provides equipment for this station, and duplicate recordings are made for our use.

Conjugate Point Experiment

Several years ago the Pacific Naval Laboratory and Stanford University established a data gathering station at Great Whale River to operate in conjunction with a similar facility at the conjugate point at Byrd Station, Antarctica. Simultaneous measurements of geomagnetic micropulsations, VLF noise, ionospheric absorption of radio waves, and fluctuations of the earth's magnetic field have been made since that time by the Pacific Naval Laboratory, Stanford, and the U.S. National Bureau of Standards. Interest in the station at Great Whale River has increased since that time and many agencies from outside Canada as well as within are now conducting experiments there. Because of the station's recent expansion, its operation and overall administration have been turned over to the National Research Council.

The National Research Council is operating Allsky cameras and an auroral photometer and a new laboratory has been completed. Stanford is carrying out VLF noise measurements. PNL is measuring ELF noise and micropulsations. The Institute for Telecommunication Sciences and Aeronomy of Boulder, Colorado, is operating five riometers. All these experiments are complementary to experiments being carried out at Byrd Station. The Institute for Telecommunication Sciences is also conducting ULF observations between 0.002 and 4 cps, the University of Western Ontario is monitoring satellite beacon transmissions, and the Bartol Research Foundation of Swarthmore, Pa., is monitoring forward scatter transmissions from Frobisher Bay. The Dominion Observatory, whose new magnetic hut and seismic vault are now completed, are operating magnetometers and seismometers on a continuous basis.

Geophysical Research in Northern Ellesmere Island

The Defence Research Board's camps at Lake Hazen and Tanquary Fiord were again active, the Entomology Research Institute of the Department of Agriculture using Hazen Camp and the Defence Research Board program being centred at Tanquary Camp. Further oceanographic data were

obtained from Tanquary, Greely, Hare and Otto Fiords, and Nansen Sound. Other work included detailed heat-balance measurements at the sea-ice/air interface, synoptic meteorological measurements, and glacier mass balance studies. A party sponsored by the National Museum made archaeological investigations. Tanquary Camp was relieved by the icebreakers CCGS John A. Macdonald and D'Iberville in late August; stores and POL were landed for the 1966 season.

Under-ice Acoustics

Arctic ambient noise studies by the Pacific Naval Laboratory were continued. A remote self recorder for ambient noise was installed in January SW of Resolute and recovered in April, and in the same month a temporary camp on the ice 150 miles northwest of Mould Bay made oceanographic reverberation and ambient noise measurements. In August experimental work over deep water was carried out in the Beaufort Sea under heavy polar ice. Logistic support was provided by the USS Staten Island from Point Barrow.

Biting Flies

The cooperative Department of Agriculture-Defence Research Board project on the effects of extreme cold on the biology of insects was continued at Lake Hazen. Seven new papers were published on the project in 1965.

The exploratory residual insecticide study at Churchill, Manitoba, in which samples of standing water, bottom soil, vegetation and animal tissue were analysed for DDT content was completed. Although significant amounts of DDT were detected in some of the samples, the high 1965 biting fly level showed that residual toxicity was probably not the cause for the low numbers in 1963-64.

A study was begun of the effect of developmental temperatures in determining the southern limit of distribution of northern mosquito species. The project has shown that certain temperature changes during the insect's development can produce impotent males and perhaps cause complete sex reversal.

Environmental Physiology

The Climatic Suite at the Defence Research Medical Laboratories is continuing to work on physiological and metabolic responses to cold exposure in humans. Animal studies are continuing to investigate:

(i) the effect of cold on lipid metabolism, and (ii) the effect of varying diets on tolerance to cold exposure.

Grants and Contracts

A number of extra-mural studies were supported by grants and contracts with universities and other non-government agencies.

Grants

- (1) To McMaster University for a study of methods of interpreting surface and sub-surface conditions in muskeg from air photographs.
- (2) To McMaster University for research on consolidation of peat under load.
- (3) To McGill University for research on the engineering properties of frozen soil.
- (4) To the University of Ottawa for a study of the submarine geology and geophysics of Barrow Strait.
- (5) To the Arctic Institute of North America for a heat budget analysis of Jones Sound.
- (6) To the Arctic Institute of North America to assist in the preparation of an Arctic Bibliography.
- (7) To McGill University for a study of the attenuation of surface waves near pack ice.
- (8) To McGill University for work on the reactions of the constituents of the upper atmosphere.
- (9) To the University of Saskatchewan for the support of research at the Institute of Upper Atmospheric Physics.
- (10) To the University of Western Ontario for research on the physics of the troposphere as related to UHF radio transmissions.
- (11) To the Canadian Military Services College, Royal Roads, for a study of the roles of the ionosphere and sun in the origin of the natural electro-magnetic background in the frequency range 0, 001 c/s to 100 Mc/s.

- (12) To the University of Western Ontario for studies of VHF radio wave scattering in the ionosphere.
- (13) To the University of Toronto for studies of the infra-red emission spectrum of the upper atmosphere.
- (14) To the University of Western Ontario for support ionospheric studies using satellites.
- (15) To Carleton University for studies of multiple-ion phenomena in the ionosphere.
- (16) To the University of Alberta for studies on the metabolic response of men in changing temperatures.
- (17) To the University of Toronto for studies of hypothermia and endocrine function, the biochemical mechanisms involved in cold adaptation, and the effects of cold on pharmacological reactions.
- (18) To the University of Manitoba for studies of vasospasm due to cold.
- (19) To the University of Ottawa for studies of endocrine function of cold-exposed animals.
- (20) To Laval University for a study of circulatory adaption to cold stress.
- (21) To the University of Western Ontario for the investigation of changes in muscle after cold acclimatization.
- (22) To the Research Institute of the Hospital for Sick Children, Toronto, for studies on the treatment of accidental hypothermia.
- (23) To the University of Manitoba for a study of personnel factors in isolated northern posts.
- (24) To the University of Alberta for research on the flight range of biting flies.
- (25) To Queen's University for research on the reactive principles and specificity of bites of bloodsucking arthropods with particular reference to mosquitoes.
- (26) To the University of Western Ontario for a study of factors in the attractiveness of objects to adult Aedes aegypti.

- (27) To the University of Manitoba for research on the behaviour of biting flies with special reference to orientation and feeding.
- (28) To the Ontario Agricultural College for studies on the life history and ecology of Simulium rugglesi.
- (29) To the University of Alberta for an investigation of the mode of action of biting fly repellents.
- (30) To the University of Manitoba for studies on the effect of developmental temperatures in determining the southern limit of northern mosquito species.

Contracts

- (1) With McGill University for research on ice physics, with special reference to the study of sea ice.
- (2) With McGill University for meteorological and geophysical work at Lake Hazen and Tanquary Fiord.
- (3) With the Arctic Institute of North America to provide limited consultant work.
- (4) With McGill University for a study of terrain evaluation and classification for mobility.
- (5) With McGill University for stratospheric research, and for the production of an atlas of 25-mb synoptic weather maps for the Northern Hemisphere.
- (6) With McMaster University for research on muskeg trafficability.
- (7) With York University for spectroscopic studies of upper-atmospheric excitation, ionization, and re-combination processes.
- (8) With the University of Saskatchewan for research on radar aurora at UHF and its correlation with geophysical phenomena. This contract is in support of the experimental program of the Prince Albert Radar Laboratory.

Plans for 1966

It is expected that the Board's program will be continued on approximately the same scale as in 1965.

NATIONAL FILM BOARD

Responsibilities The production of motion pictures, filmstrips, slides and still photo stories about the Canadian North, its people and their activities and its resources; arrangements for distribution of this film material in Canada and abroad, including servicing of northern posts and settlements; assistance to government agencies by advising in the use of visual media and in planning audio-visual programmes for informational and instructional purposes.

Long-term Plans

Production of films for the general public in Canada and abroad which will up-date their image of northern Canada in step with the development of the region.

Production of films for school audiences which will enable teachers to present an accurate image of Northern Canada and prepare those young people whose work will take them to the north.

Production of films for special audiences on behalf of the responsible government agencies; - to attract Canadian and foreign investment for northern resource development; to attract specialists such as doctors and teachers to the north; to provide teaching aids for Indians and Eskimos and films of social value for all northern peoples; to attract tourists, hunters and fishermen.

Gradual development of community film distribution services in the north which are appropriate to the stage of development of the various areas, - maintaining in the meantime a central outpost film service for the very small and very isolated places.

Review of 1965 Operations

Two films on northern resources were initiated for the Department of Northern Affairs and National Resources to indicate the wealth that is there and what is being done to develop it. A major purpose is to encourage Canadian and foreign investment in the north.

One film on the development of modern community facilities in the north was begun for the same department. It is intended for public audiences in Canada and abroad to be reached through theatres, then by 16mm showings and television.

Other films on the north completed during the year:-

GLACIATION
HENRY LARSEN
STEFANSSON, THE ARCTIC PROPHET
FLYWAY NORTH

New stories produced:

JET-BLACK MINK
ARCTIC CHAR
FORT SEVERN, PAYNE BAY
PLASTIC IGLOOS
DOME-COVERALL BUILDINGS

Still-Photo Stories:

ARCTIC BIOLOGICAL STATION
SEARCH FOR OIL
ALONG THE WALNUT RUN

Filmstrips:

BUILD YOUR OWN LOG HOUSE, Pt. 1 & 2
ESKIMO CHILDREN ON BAFFIN ISLAND
GLACIERS

Plans for 1966

A film on the northern doctor will be produced for the Department of National Health and Welfare to aid recruitment and to interpret the work and life of northern doctors.

A group of four filmstrips on co-operatives for northern peoples will be made for the Northern Administration Branch, Department of Northern Affairs and National Resources.

Two more filmstrips in the series on government in the north will be made for the same branch.

A film on big game in the Mackenzie District is being considered.

A film on fishing techniques suitable for Indians fishing Great Slave Lake is being completed.

A distribution officer will make a fairly detailed survey trip to the mouth of the Mackenzie River in the spring of 1966 in order to plan more comprehensive film services for this area.

DEPARTMENT OF NATIONAL HEALTH AND WELFARE

HEALTH

Responsibilities Northern Health Service

All responsibilities of the Federal Government in the field of health, except where military authorities operate health facilities within military establishments.

All responsibilities of the Territorial Governments in the field of health, undertaken by arrangements with these governments, except the hospital insurance program. These arrangements are subject to the sharing of costs between the Federal and Territorial Governments in approximate proportion to their respective responsibilities.

Consultative Services

Public Health Engineering, Epidemiology, Maternal and Child Health, etc. on request of the responsible authorities.

Long-term Plans

To develop Northern Health Services, to co-ordinate all federal health services, and to co-operate with community health services in the same manner as would a department of health in a province. This system should, within the budgets of the interested agencies, provide for the types of health services most suitable for the unique distribution of population. To continue the operation of all existing health units in the Territories and to develop new facilities, in co-operation with the Territorial Administrations, as and when the need for them is demonstrated and resources are made available.

Review of 1965 Operations

Progress on the implementation of both the Yukon and Northwest Territories Health Plans 1962-67 continued to be satisfactory. The new 30 bed hospital at Frobisher Bay which was completed in 1964 is now operating at full capacity. The new H.H. Williams Memorial Hospital at Hay River, N.W.T.,

which was built by the Pentecostal Assemblies Mission under the aid of Federal Territorial and Medical Services grants was officially opened during the year and is now in full operation.

Construction began on the new Stanton Yellowknife Hospital, and it is expected to be completed by the Summer of 1966. This structure will replace the old hospital at Yellowknife, which has served this Northern Community for many years.

One new Nursing Station was erected during 1964 and two old Nursing Stations were replaced. The new station was erected at Fort Franklin on the South Western arm of the Great Bear Lake where the Indian population has been increasing rapidly over the past five years. The old Nursing Station at Aklavik was replaced by a modern three ward institution while the Rankin Inlet Nursing Station was replaced by a trailer nursing station composed of two 44' x 12' and one 30' x 10' trailers. The decision to use a transportable trailer type of station at this centre was based on the fact that there has been a gradual but steady reduction in the population of this settlement since the closure of North Rankin Nickel Mine and it would have been unwise to erect a permanent Nursing Station at a cost of \$150,000.00, until it is definitely determined whether the population will remain at the present site.

It was possible to keep most Medical Officer posts filled during the year, but the rapid turnover of such staff impedes the development of uniform and effective programs of treatment and public health. Some incentive must be found to keep Medical Officers in the North for at least two-three years, and suggestions to achieve same have been passed forward. The situation as regards Dental Officers has remained acute and the dental health program leaves much to be desired. Intensive efforts were made during the year to encourage private dental practitioners to set up in practice in the Territories. The Yukon Pilot Dental Project continued satisfactorily and all concerned are highly satisfied with the results to date.

No serious epidemics were reported during the year, but the problems of venereal disease in the Mackenzie District is increasing in spite of all efforts to reduce incidence. Arrangements were made with the Mental Health Division of the Departments of Health of the Governments of Alberta and Manitoba to send Provincial Child Guidance teams into the Mackenzie and Keewatin Districts - this much needed service was very much appreciated by teachers, nurses, social workers and others involved in the problems of mental health.

Plans for 1966

It is proposed to erect two nursing stations in 1966 - one permanent nursing station at Igloolik and one three-trailer nursing station at Pond Inlet.

Arrangements have been made to expand our measles vaccination program to include nearly all settlements in the Yukon and Northwest Territories. A new Northern Region of Medical Services, which will be based at Edmonton will be formed in April, 1966 - this Region will administer the health programs of the Yukon and Northwest Territories.

A training course for Eskimo Community Health Workers is planned for 1966.

WELFARE

Responsibilities Administration of Family Allowances, Family Assistance, Youth Allowances and the Old Age Security Program, with the co-operation of the Department of Northern Affairs and National Resources and other agencies. Assistance to elderly, blind, disabled, and needy unemployed residents of the north. Assistance to Territorial governments through the Fitness and Amateur Sport Program and the National Welfare Grants Program.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

Family Allowances

A total of \$1,311,857 was paid in Family Allowances in the Yukon and Northwest Territories in 1965. At the end of the year there were 6,330 families with 16,402 children receiving Family Allowances.

Family Assistance

Family Assistance payments made to immigrants and settlers totalled \$1,922 in 1965. In the last month of that year, assistance was paid to 9 families for 20 children.

Youth Allowances

1965 was the first full year of operation of the Youth Allowances program in Canada. In that year, Youth Allowances payments in the Yukon and Northwest Territories totalled \$56,114. In December, 1965, Youth Allowances were being paid to 410 families in the Territories for 533 children.

Old Age Security

Old Age Security pension payments in the Yukon and Northwest Territories totalled \$639,143 in 1965. There were 703 persons receiving pensions in December, 1965.

Old Age Assistance, Blind and Disabled Persons Allowances

Under agreements with the Yukon and Northwest Territories, the Department of National Health and Welfare pays 50 per cent of the costs to the Territories of Old Age Assistance and Disabled Persons allowances, and 75 per cent of the costs of Blind Persons Allowances. On December 31, 1965, in the Yukon 33 persons were covered under Old Age Assistance, 6 under Blind Persons Allowances, and 2 under Disabled Persons Allowances; in the Northwest Territories 171 persons were covered under Old Age Assistance, 49 under Blind Persons Allowances and 49 under Disabled Persons Allowances.

Federal Payments to the Territories during the year 1965 amounted to \$92,025 for Old Age Assistance, \$36,975 for Blind Persons Allowances, and \$22,575 for Disabled Persons Allowances.

Unemployment Assistance

Under the Unemployment Assistance Agreement the Department of National Health and Welfare shares with the Yukon and Northwest Territories the costs of their social assistance payments. The Agreements provide for sharing in payments for persons who are unemployed and in need, including recipients of Old Age Security, Old Age Assistance and Blind and Disabled Persons Allowances who need additional help, and persons in homes for special care, particularly homes for the aged and nursing homes.

Fitness and Amateur Sport

Under the Fitness and Amateur Sport program, Federal allocations of \$35,759 were made available for the Northwest Territories and \$35,479 for the Yukon. As in the case of other provinces which have signed an agreement with the Federal Government under the Fitness and Amateur Sport Act, the two Territories contributed \$40 for each \$60 made available through the program. With this assistance during 1965, the Territories continued to support the operation of their respective administrative services, they have conducted leadership and coach training courses in sports and recreational activities; assisted amateur sport championship meets,

local physical education and recreation conferences and workshops, and the purchase of instructional materials and visual aids to assist the establishment of recreational programs in many areas of the Territories.

National Welfare Grants

For the fiscal year 1965-66, \$13,275 was made available to the Yukon Territories. The same sum was also made available to the Northwest Territories.

These funds were used by the Yukon Territories in the current fiscal year to assist in meeting the costs of new services in the fields of probation and alcoholism, to provide training grants for staff on educational leave attending schools of social work, and for consultative services related to the improvement of welfare administration in the Yukon.

The Northwest Territories are using these funds to assist in the costs of similar services in the fields of alcoholism control and probation, and to provide bursaries through which staff will be recruited for welfare in the Territories.

Plans for 1966

There will be a continuation of programs designed to assist in meeting the welfare needs of the population of the Yukon and Northwest Territories.

NATIONAL MUSEUM OF CANADA

HUMAN HISTORY BRANCH

Responsibilities Investigations relating to the archaeology, physical anthropology, ethnology, botany, zoology, and vertebrate palaeontology of the north, and the collection, preservation, and display of specimens required for research and public information.

Long-term Plans

Normal Planning to meet responsibilities.

Review of 1965 Operations

In 1965 the Museum carried out archaeological surveys in the Yukon Territory and briefly in the Mackenzie Delta, excavations on Banks and Victoria Islands and, by co-sponsorship, survey and excavations near Igloolik, near Wakeham Bay, and on Ellesmere Island.

An ethnologist of the Human History Branch spent from February to August on genealogical, linguistic and historical research among the Netsilik Eskimo in the Gjoa Haven and Spence Bay Region.

Plans for 1966

1966 plans call for archaeological work in the western Arctic, Yukon Territory, southern Alaska, and Bylot Island and near Wakeham Bay. Physical anthropological work in conjunction with archaeological work is planned for Foxe Basin.

It is expected that an ethnologist shall go to Baker Lake for the purpose of supervising the making of skin clothing and a kayak.

One ethnologist on contract will be studying economic life and communications in the Payne Bay region and another will study Eskimo community life on the North-Eastern Labrador coast.

NATURAL HISTORY BRANCH

Responsibilities Investigations relating to the botany, zoology, and vertebrate palaeontology of the north, and the collection, preservation, and display of specimens required for research and public information.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

A survey of the mammals of western Yukon and Carcajou L. region of Northwest Territories, directed by Mr. P.M. Youngman and his assistant, Mr. G. Tessier during July and August.

A study of the fresh-water molluscs of the drainage basin of southwestern Hudson Bay and James Bay and marine molluscs off Churchill, conducted by Dr. Arthur Clarke and his assistant, Mr. L. Marhue, during July.

Collections of fossil birds and reptiles from Cretaceous beds along the Anderson River, N.W.T., by Dr. D.A. Russell in July.

Collection of a fossil plesiosaur at Mould Bay, N.W.T., by Mr. Harold Shearman in August.

Plans for 1966

A study of fresh-water molluscs of Hudson Bay drainages northwest of Churchill by Dr. Arthur H. Clarke and his assistant during July.

A study of marine shore fishes of Newfoundland, including the Belle Isle Strait and outer coast subarctic regions, by Dr. D.E. McAllister, during July.

A study of fossil vertebrates of the Cretaceous badlands of the Lower Horton R., N.W.T., by Dr. D.A. Russell during July and August.

A study of Pleistocene fossil vertebrates of the Stuart and Old Crow areas of the Yukon, by Mr. Richard Harington during July and August.

NATIONAL RESEARCH COUNCIL

Responsibilities Investigations into various phases of pure and applied sciences in northern Canada.

Long-term Plans

Four Divisions of the National Research Council have a continuing interest in the North.

The Division of Pure Physics is involved with two major programs in northern Canada; cosmic ray observations and geomagnetic conjugate point experiments.

The Division of Building Research conducts studies of permafrost and northern building problems.

The Radio and Electrical Engineering Division carries out radio and optical observations of upper atmospheric phenomena, e.g. the aurora, during minimum and maximum peaks of the sunspot cycle.

The space Research Facilities Branch operates the Churchill Research Range and the former Defence Research Northern Laboratory.

Other Divisions of the National Research Council become involved periodically with northern work on a short-term basis.

Review of 1965 Operations

Division of Pure Physics

Cosmic ray observations were carried out at five stations in northern Canada (Resolute Bay, Churchill, Alert, Inuvik and Goose Bay) to study the variations in cosmic ray flux. The old I.G.Y. installation at Resolute Bay was replaced by new equipment and a super-neutron monitor was installed at Alert. The Canadian network of high latitude stations has thus been completed. These observations are part of an international program of cosmic ray studies carried on in collaboration

with Atomic Energy of Canada, Ltd., Chalk River and the Southwest Center for Advanced Studies, Dallas, Texas.

Responsibility for the co-ordination of the scientific programs at the Great Whale River conjugate point station was transferred in September 1965 from the Cosmic Ray Section of the Division of Pure Physics to the Upper Atmosphere Section of the Radio and Electrical Engineering Division.

Division of Building Research

Field studies of permafrost were conducted at widely separated locations in northern Canada from Baffin Island on the east to northern Ontario and Manitoba in the south and the Mackenzie River Delta in the west. Reconnaissance visits were made in July to assess permafrost conditions and engineering problems at several proposed construction sites in northern and southern Baffin Island. Studies of the thawing effect of water on the distribution of permafrost at a small lake near Inuvik and field observations on the performance of water retaining dykes constructed on permafrost at Kelsey in northern Manitoba were continued.

Ground temperature observations were made throughout the year and field surveys conducted in September and October at Inuvik, N.W.T. to follow the performance of various structures erected on permafrost including the airstrip and building foundations, and to evaluate the influence of construction and habitation on permafrost conditions.

A field survey by helicopter was carried out during September to determine the distribution of permafrost and the physical features affecting its occurrence in the Hudson Bay Lowland. A series of north - south traverses were flown across the southern fringe of the permafrost region between James Bay and Thompson, Manitoba. This work is a continuation of a program initiated several years ago to gather information to assist in mapping the southern boundary of the permafrost region. Compilation of a detailed map of permafrost distribution in Canada was begun in 1965.

Field studies to evaluate the effectiveness of ice dusting and removal of the snow cover on bodies of water for advancing break-up in the north were carried out on a small lake at Inuvik and on Milne Inlet, northern Baffin Island.

Co-operative studies, including field tests, undertaken with the Department of Northern Affairs and National Resources to evaluate the design, methods of erection and performance of a small, stressed skin panel building for the far north were completed. The study of condensation problems in northern buildings was continued and a preliminary analysis of field observations carried out.

Radio and Electrical Engineering Division

The I.Q.S.Y. observations of aurora and airglow were satisfactorily completed and staff and equipment at both Baker Lake and Resolute Bay were withdrawn in June, 1965. Auroral and airglow phenomena observations were continued at Churchill using radar and photographic techniques.

The Upper Atmosphere Section assumed responsibility for co-ordinating various co-operative scientific programs underway at Great Whale River.

Division of Biosciences

This Division is interested in the north as a source of psychrophilic bacteria. Samples were received from the Fisheries Research Board for bacteriological studies.

Space Research Facilities Branch

On July 1, 1965, the Council through its Space Research Facilities Branch took over the Defense Research Northern Laboratory at Churchill and has continued the programmes of auroral and other geophysical observations carried out at this location. On the same date NRC also became a partner with the U.S. National Aeronautics and Space Administration in the operation of the Churchill Research Range and established a group to work with the U.S.A.F. to learn the job of managing the Range. On December 31, 1965 NRC took over full responsibility for the Range from the U.S.A.F.

Division of Mechanical Engineering

Studies of the icing conditions in Churchill harbour were continued. Velocities, salinities and water temperatures were measured throughout the harbour; from the ice cover in April and from a ship in July. All survey positions were occupied for the duration of one tidal cycle. During break-up and freeze-up visual observations of ice conditions were recorded 4 times daily by National Harbours Board staff. In the autumn, two automatic time lapse cameras were operated continually to record ice movement during

freeze-up. A hydrographic survey of the upper part of the estuary and the temporary installation of additional tide gauges were completed by the Department of Mines and Technical Surveys. Aerial Photographs of the harbour and adjacent coast were taken in color in order to assess the importance or extent of suspended sediment.

At Tuktoyaktuk, N.W.T., a submersible pump was installed in the harbour in April and its effectiveness evaluated. Measurements of water discharge, water temperature and salinity were obtained to refine and confirm previous work. Additional measurements employing a directional velocity meter were run at the entrance to Kugmallit Bay so that the heat flow into the harbour area could be estimated.

At Milne Inlet, Baffin Island, measurements of salinity and water temperature were made to depths of 300 ft from the ice cover in March. Additional measurements of velocity, salinity and temperature were made after the opening of navigation. This work was carried out in support of an iron mining development and a report on the feasibility of extending the navigation season was prepared.

National Aeronautical Establishment

In the summer of 1965 an experimental aeromagnetic survey was flown over a small area near the centre of Hudson Bay to investigate the application of high sensitivity magnetic surveys to oil prospecting. Sixty lines approximately 100 miles in length were flown at a line spacing of about 3/4 mile. The magnetic data derived from two rubidium vapour magnetometers were recorded in digital form on magnetic tape along with DECCA navigation data. Computer techniques for analyzing the data are being investigated.

Plans for 1966

Division of Pure Physics

Both the cosmic ray studies at the five northern stations and the conjugate point program at Great Whale River will be continued.

Division of Building Research

Permafrost distribution surveys will be undertaken in western Quebec east of James Bay. Field studies of permafrost and the performance

of engineering structures and facilities founded on perennially frozen ground will be continued at Inuvik, Thompson and Kelsey. A detailed field testing program to evaluate the problem of providing anchorage in permafrost for guyed E.H.V. transmission line towers will be initiated at selected locations in northern Manitoba. It is tentatively proposed to establish a field station at Thompson to support the increasing work of the Division in this area. Attention to northern building superstructure problems will be maintained with specific observations on structures in which problems have occurred.

Radio and Electrical Engineering Division

Observations of upper atmosphere phenomena will be continued at Churchill.

Space Research Facilities Branch

Operation of the Churchill Research Range will be continued for the launching of sounding rockets and balloons to investigate geophysical phenomena in the earth's upper atmosphere and higher on behalf of scientists from Canada, the U.S.A. and also other countries. Associated ground-based observations are also carried out at the Churchill Research Range.

Two sounding rockets will be launched from Resolute Bay in July 1966 by the S.R.F.B. for specialized investigations near the north magnetic pole. This work will be carried out on behalf of scientists from the University of Alberta (Calgary), the Division of Pure Physics and the Radio and Electrical Engineering Division of NRC. Scientists from D.R.T.E. and the Goddard Space Flight Centre of the U.S.A., N.A.S.A. may also participate.

Division of Mechanical Engineering

It is planned that automatic time lapse cameras will be reinstalled to record spring break-up in Churchill Harbour.

National Aeronautical Establishment

Magnetic profiles flown across the Labrador Sea in 1964 showed good correlation and indicated the possible existence of a median ridge extending through the Sea. This work will be extended in 1966. Ten flight lines at 10 mile spacing will be flown over the Labrador Sea out of Goose Bay. Ten flight lines at 50 mile spacing will also be flown over Baffin Bay and Davis Strait between Latitudes 65°N and 73°N from Sondrestrom, Greenland.

The N.A.E. is participating in joint U.K. - Canadian trials of an SRN 5 air cushion vehicle in the Arctic to obtain a preliminary assessment of the potentialities of this type of vehicle for northern transportation. The operations, planned for mid-April to mid-June 1966, include journeys over land, water and ice. The N.A.E. is particularly concerned with means of extracting useful quantitative data for application in future design studies. A photogrammetric analysis of portions of the terrain encountered will be made and a numerical correlation of the performance of the vehicle with parameters describing the roughness of the surface attempted.

DEPARTMENT OF NATIONAL REVENUE

CUSTOMS AND EXCISE

Responsibilities To administer the Customs and Excise laws and regulations, particularly the Customs control of movement of aircraft and vessels.

Long-term Plans

To increase Customs service in pace with the development of the north.

Review of 1965 Operations

In the Yukon Territory, Whitehorse and Dawson were operated as Customs ports. Sub-offices under Whitehorse were Beaver Creek, Carcross and Pleasant Camp, B.C., and under Dawson was the sub-office of Old Crow.

The regular Customs office at Frobisher Bay, N.W.T., was operated on a part-time basis by an employee of the Post Office Department, under the jurisdiction of the Port of Ottawa. (effective January 12, 1966, the jurisdiction for Frobisher Bay, N.W.T., was assumed by the Port of Goose Bay, Nfld., to be serviced by the R.C.M.P.) The Inuvik office was operated on a part-time basis by an employee of the Department of Northern Affairs under the jurisdiction of the Port of Edmonton.

At sixteen other points officials of other government departments acted as Customs Officers for the purpose of clearing ships and aircraft. These were as follows:

Royal Canadian Mounted Police

Baker Lake	Pangnirtung
Cambridge Bay	Pond Inlet
Coppermine	Resolute Bay
Eskimo Point	Sachs Harbour
Lake Harbour	Spence Bay
	Tuktoyaktuk

Department of Transport

Alert	Isachsen
Coral Harbour	Mould Bay
Eureka	

Plans for 1966

Normal planning to meet responsibilities.

TAXATION DIVISION

Responsibilities The administration of the Income Tax and Estate Tax Acts; the assessment and collection of these taxes.

The administration of Part II of the Canada Pension Plan; the assessment and collection of contributions to the Plan from employers - employees and self-employed persons and the conversion and recording of these contributions to individual earned pension accounts for each participant.

Long-term Plans

Normal planning to meet the requirements of this area in the light of any increases in population.

Review of 1965 Operations

Taxation and Canada Pension Plan matters in the Yukon Territory were handled through the District Office at Whitehorse and those of the Northwest Territories through the District Office at Edmonton.

Plans for 1966

The establishment of the Whitehorse Office is a small one of only eight persons and will be at full strength during the year.

Taxation and Canada Pension Plan matters in the Northwest Territories will continue to be dealt with by periodic visits by members of the Edmonton Office staff to Yellowknife, Fort Smith and other centres as necessary.

DEPARTMENT OF NORTHERN AFFAIRS AND NATIONAL RESOURCES

CANADIAN WILDLIFE SERVICE

Responsibilities Surveys and inventories of wildlife resources; conducting research on wildlife species in relation to their habitat; collection and analysis of animal population and utilization data; recommending management procedures for particular species of economic importance; acting as consultants of fisheries and marine mammals; research, management, and administration of migratory birds under the Migratory Birds Convention Act; co-ordination of federal, provincial, and territorial action on common wildlife problems, including caribou research and management, and wildlife disease studies.

Long-term Plans

To continue the studies of major wildlife resources: to extend research to less-known species; to establish more adequate research facilities in the field; to assess the success achieved in management of wildlife resources to date, and the potential success in this endeavour for the future.

Review of 1965 Operations

Mammal Projects

Preliminary studies of the range in the Reindeer Preserve were undertaken by the range ecologist as the initial phase of an intensive study to determine the value of the range to reindeer and the numbers of those animals that can be supported efficiently.

The study of the basic nutritional requirements of barren-ground caribou and other physiological characteristics was continued in co-operation with the University of British Columbia. The biologist responsible for the study attended the meetings on productivity of terrestrial communities sponsored by the International Biological Program in Aberdeen and Cambridge.

Studies of barren-ground caribou distribution and utilization were continued. A highly successful tagging program was carried out with more than 1,600 caribou being tagged.

An aerial survey of Coats Island caribou was conducted in March and an annual harvest by Eskimos was recommended. About 800 caribou are on the island.

The caribou northeast of Wordie Bay, Baffin Island, were studied to obtain specific information on reproduction, age structure and body condition. A limited aerial survey was also carried out to obtain data on distribution and movements.

The study of the ecology of wolves on barren-ground caribou range was terminated after the field season. The biologist in charge is preparing a complete report of the entire study.

A preliminary assessment of the feasibility of conducting a study of Baffin Island wolf ecology was undertaken northeast of Wordie Bay.

Polar bear research was continued, particularly in the Resolute Bay and Southampton Island areas. Particular emphasis was placed on den ecology and behaviour of females and cubs after emergence from dens.

The study of the ecology of grizzly bears in the Yukon Territory was continued in the Kluane Game Sanctuary and additional biological data were obtained from bears killed by sportsmen elsewhere in the Yukon.

Studies of muskrat, beaver and mink ecology were continued on the experimental trapping area in the Mackenzie River Delta. Carcasses from marten trapped in the Anderson River country were collected for reproductive and other biological information.

A number of wood bison were captured in the northwest corner of Wood Buffalo National Park, vaccinated for anthrax, tested for other diseases and after quarantine, 21 were shipped to Elk Island National Park for propagation and research. Anthrax control continued in Wood Buffalo National Park. No deaths positively attributed to anthrax were recorded in 1965.

Factors affecting the distribution and numbers of red squirrels were studied in the Fort Smith area.

Ornithology Projects

The study of the breeding biology and distribution of Ross' Geese continued in the Queen Maud Gulf area.

Periodic aerial surveys of whooping crane breeding areas in Wood Buffalo National Park were continued.

Aerial reconnaissance of goose habitat on Baffin Island was initiated.

Banding of geese was carried out at two colonies on Southampton Island.

Work continued near Eskimo Point on the life history and population dynamics of small races of Canada geese which breed there.

A study of factors influencing predation on goose colonies by parasitic jaegers was started at McConnell River.

A study on the feeding habits and nutritional requirements of snow geese was started at McConnell River.

An ethological study of the family group structure of snow geese was started at McConnell River.

Investigation of the breeding biology of nesting Arctic geese at Anderson Delta was terminated.

Banding of whistling swans in the Mackenzie Delta was started.

Investigations of the life history of ravens in the Inuvik area were begun.

Banding of moulting Canada geese continued in the Thelon River area.

Bylot Island was set aside as a Migratory Bird Sanctuary to protect nesting murres and greater snow geese.

Plans for 1966

Mammal Projects

An intensive study of the Manitoba-Keewatin caribou herds will be initiated. Particular attention will be directed to gathering information on reproduction, age and sex ratios, body condition and range characteristics.

Research will continue on the nutritional requirements and the physiological characteristics of barren-ground caribou.

In co-operation with the University of Toronto, a study of wolf ecology on Baffin Island will be initiated.

Polar bear research will continue, with emphasis on tagging to obtain information on movements.

Grizzly bear research in the Yukon Territory will continue. The study of factors affecting distribution and numbers of red squirrels in the Fort Smith area will be continued.

Studies of population ecology of muskrats, beaver and mink will be continued on the experimental trapping area in the Mackenzie River Delta.

The study of the reindeer range in the Delta region will continue.

Ornithology Projects

All projects listed as having been carried out in 1965 will be continued except that the Anderson River goose studies will be terminated apart from banding.

Banding of snow geese nesting at Kendall Island is to be carried out.

Banding of geese at the mouth of the Koukdjak River is to be attempted.

A comparative study of Knot-Turnstone breeding biology and behaviour in the Hazen Lake area will be initiated.

A comparative study of Pomarine-Parasitic jaegers will be started in the Hazen Lake Area.

Investigations of waterfowl breeding in the Old Crow Flats area will be started.

NATIONAL PARKS SERVICE

Responsibilities The administration of the National Parks Act and regulations in order that national park areas in northern Canada are maintained and made use of for the benefit, education, and enjoyment of the Canadian people.

Long-term Plans

To select and administer areas which contain representative features worthy of preservation as part of the National Parks system.

Review of 1965 Operations

On March 31, 1965, the Branch took over operational responsibility in Wood Buffalo National Park. An active anthrax control program was waged. Progress was made on a road link, through the Park, connecting Fort Smith to Pine Point and Hay River.

Plans for 1966

Unless there is a specific request to assess the national park potential of a particular area, no field studies will be carried out. A major effort will continue to be made to combat anthrax in Wood Buffalo Park buffalo herd. The possibility of adjusting the park boundaries will be investigated. Completion of the Fort Smith - Pine Point road.

HISTORIC SITES DIVISION

Responsibilities At the present time this Division's responsibilities in the North are fairly limited. Most of the present suggestions for commemoration of historically important persons, places or events are of a territorial, as opposed to national, nature only. This work will be handled by the territorial governments with advice where necessary being supplied by the federal government.

In particular, the Division is responsible for the maintenance of the Palace Grand Theater and the S.S. Keno, a sternwheeler, at Dawson in the Yukon, and for the restoration of the S.S. Klondike, another sternwheeler, in Whitehorse.

Long-term Plans

Most of this Division's long-term plans lie in assistance to the territorial governments in their historic site marking program.

The only specific long-term plan at the moment is the restoration of the S.S. Klondike over a three-year period at an estimated cost of approximately \$238,000. This plan includes movement of the vessel to a new site, restoration and refurnishing of the vessel and the establishment of a museum on board.

Review of 1965 Operations

The Division continued the maintenance of the Palace Grand Theater, and the S.S. Keno. Tenders were called for moving the S.S. Klondike.

Plans for 1966

To continue maintenance of the Palace Grand Theatre and the S.S. Keno.

Tenders for movement of the S.S. Klondike are expected to close early in 1966. The vessel is scheduled for its move early in the spring before ground thaw makes it impossible to move an object of this weight. Preliminary restoration work on the vessel during 1966 is anticipated.

THE COUNCIL OF THE NORTHWEST TERRITORIES

Responsibilities To exercise legislative powers comparable to those of a province.

Long-term Plans

The enactment of legislation comparable to that of a province and in keeping with changing conditions; gradual evolution toward provincial status with a representative and responsible government.

Review of 1965 Operations

In August of 1965 Stuart M. Hodgson of Vancouver was appointed Deputy Commissioner replacing W.G. Brown who was obliged to resign in February due to ill health. Mr. Hodgson is the first full-time Deputy Commissioner. This is further evidence of the growing emphasis on the establishment of the Territorial Public Service.

The appointment of Abe Okpik on October 18, 1965 as an appointed Member of Council is yet another milestone. Mr. Okpik is the first Eskimo member and the first Territorial resident appointed to the Council since 1946.

During the year there were three sessions of Council - Ottawa in February, Yellowknife in June and Ottawa in October. As is customary the winter session was primarily an Appropriations Session. At this first Session only four bills were presented but there were ten Recommendations to Council and ten Sessional Papers. One of the Bills provided for the establishment of a Probation Service as an integral part of the Corrections Program approved earlier; another provided the Commissioner with authority to regulate features of the tourist business; the other two were Appropriations Ordinances.

Of the ten Recommendations to Council the most important concerned changes in the system of financing school districts; and the establishment of an Alcohol Education Program.

At the second Session, in Yellowknife in June, there were 12 Bills, 10 Recommendations to Council and 17 Sessional Papers.

The two most important Bills were those to establish a Territorial Public Service and to authorize the Commissioner to create three new electoral districts encompassing those parts of the Territories now without representation on Council, when Parliament increases the number of Members of Council as anticipated.

The Recommendations to Council ranged from Game matters, to Liquor; Territorial Corrections Program and others.

The third Session, 1965, the thirty-first Session, was called to consider what recommendations Council should present to the Commission on the Development of Government in the N.W.T. The Council met in Ottawa for four days of study and discussion. Final decisions were not reached but guide lines were laid for members to advise the Commissioner on specific aspects of the problem. On the basis of this advice the Commissioner would draft a paper to be considered and finalized at the first Session, 1966.

This year saw the beginning of concrete plans for a Territories-wide Public Library service with headquarters at Hay River; the appointment, in conjunction with the Government of the Yukon, of a Civil Emergency Planning Officer with headquarters in Edmonton; the employment of an Editor of Debates, Ottawa; and a Tourist Development Officer, Fort Smith, all Territorial Government employees.

An Advisory Commission on the Development of Government in the North-west Territories was appointed by the Minister of Northern Affairs following a request for such a body by the Council during the 1964 Session at Frobisher Bay. The Commission is to report by mid 1966.

Plans for 1966

The Territorial Government will continue to administer the affairs of the Territories with more emphasis on the development of its own Public Service and the assumption of functions of a Territorial nature formerly carried out on its behalf by the Department of Northern Affairs and National Resources.

COUNCIL OF THE YUKON TERRITORY

Responsibilities To exercise legislative powers comparable to those of a provincial legislature.

Long-term Plans

Enactment of legislation comparable to that of the provinces and in keeping with changing conditions: gradual evolution toward provincial status.

Review of 1965 Operations

The Council was called for two Sessions. The first was from March 15th to April 12th, and the second from November 10th to December 14th.

During the First Session ten ordinances were passed, the most important of which was the new Legal Profession's Accounts Ordinance.

The Second Session dealt with nine ordinances, the most important of which was a new Local Improvement Districts Ordinance.

The Territorial Council Financial Advisory Committee visited Ottawa in the Spring to discuss matters concerning the Territory.

Mr. John Watt, Councillor from Whitehorse West, resigned his seat on November 23rd. He was again returned in the by-election held in March, 1966.

ADMINISTRATION OF THE YUKON TERRITORY

Responsibilities To administer the Ordinance of the Yukon and carry out the responsibilities of the Department of Northern Affairs and National Resources in the Territory except those relating to water resources.

Long-Term Plans

Economic development to the point where increased population and revenues resulting therefrom would warrant full provincial status.

Review of 1965 Operations

Territorial Secretary

Eighteen thousand three hundred and fifty-two licences, certificates, registrations, etc., were issued under the Motor Vehicles Ordinance. The office recorded 435 births, 96 deaths, 107 marriages and registered 1,991 documents under the Conditional Bills of Sales, Bills of Sale Garage Keepers, and Partnership Ordinances. The total real property assessment, April 1st, 1964 to March 31st, 1965 is \$6,430,000., a slight increase over last year and the total tax levy, \$136,800.

Senior Advisory Counsel

Council, at its two Sessions, considered a total of 15 Bills, compared with 32 Bills reviewed in 1964.

At the end of the year, there was a sharp burst of activity in Land Titles and Joint Stock Companies work, and this is associated with the upsurge in mining following the evaluation of the Ross River discoveries.

The volume of Land Titles work decreased slightly. Fifty-two companies were registered as against 63 in 1964. The number of societies registered was 3, compared with 10 in the previous year.

Territorial Department of Education

After a slight decline in the previous year, enrolment in Yukon schools has again continued its upward movement. In September, 1965, there were 3,178 pupils enrolled in 22 schools with a full-time teaching staff of 149. This compared with 3,033 pupils, 23 schools, and 149 full-time teachers in September, 1964. The number of schools declined because of the closure of the Department of Public Works maintenance camp at Brooks Brook.

In addition to the 22 schools which are part of the Territorial system, the Department of Education also supervises instruction in the Carcross Indian Residential School, the Lower Post Indian Residential School, and the Klappan Indian Day School. The latter two schools are located within the administrative area of the Yukon Indian Agency.

Within the past year Industrial Arts shops and Home Economics laboratories were added to the secondary school facilities at Dawson, Mayo and Watson Lake. The high schools in these localities are offering not only academic subjects but also courses in Commercial, Home Economics and Industrial Arts. During the year also, the Industrial Arts shops of the F.H. Collins Secondary School were increased in size by the enlargement of the Metalwork shop and the Woodworking Shop. An Electrical Shop and a Drafting Room were added to the complex. Christ the King High School facilities were also improved by the addition of an adequate Library and an improved Science Laboratory.

Vocational Training

The Whitehorse Vocational Training School completed another year of successful operation which culminated in the placement of all students, who graduated, into the employment field, as a direct result of their training.

Territorial Department of Public Works

All roads in the Territory, with the exception of the Alaska Highway and the Haines, Aishihik, Snag and Cassiar Roads, were maintained by Territorial crews and equipment. The anticipated cost of road maintenance to the end of the fiscal year is approximately \$1,200,000.00 compared with \$985,000.00 for the previous year. This year, because of increased mining activity, the Canol Road to Ross River, 138 miles, and the Dawson-Boundary Road to the Clinton Creek cut-off, 34 miles, have been kept open for winter use.

From a total of some \$400,000.00 spent on Building Construction in 1964/65, we have increased this year to approximately \$1,300,000.00. This includes the new Yukon Regional Library in Whitehorse, a \$380,000.00 addition to the Vocational School in Whitehorse and a new school at Carcross.

Road construction expenditures decreased from \$590,000.00 in 1964/65 to \$470,000.00 this year. Contracts were let for the construction of five new concrete bridges to replace wooden structures. Three of these bridges have been completed.

Forestry

Timber Production again remained at approximately 8 million board feet and 2 million lineal feet of round timber. Increased mining activity towards the end of the calendar year brought about an increased demand for mine timbers in various areas of the Territory.

The 1965 fire season in the Yukon Territory was the heaviest since 1958 with a total of 75 fires burning an area of 18,674 acres.

The Forest Service continued operation of public campgrounds and carried on major improvements at three more sites. Two additional campgrounds were also constructed.

Mining

This year proved to be one of the most active years for mining exploration that the Yukon has ever experienced. There were between 40 and 50 companies, three or more syndicates and approximately 40 prospectors receiving prospector's assistance, actively engaged in exploration throughout the Territory.

Office of the Supervisor of Lands

Possibly due to the high cost of lands below the 60th parallel, many enquiries were received, better than half of which were regarding agricultural and grazing lands.

Territorial Department of Travel and Publicity

A 26% increase in the number of tourists has continued the upward trend of this valuable industry. During the months of June, July and August, tourist dollars contributed approximately \$3 1/2 million to the economy of the Territory. Enquiries processed during the year are expected to exceed 35,000 for a 13% increase over 1964.

Territorial Department of Housing and Area Development

This Department continued its program of assistance to communities throughout the Yukon in municipal matters and the program was extended during the year to include Insect Control and Dust Control.

The Squatter removal program in Whitehorse and the Low Cost Housing Program for the Yukon progressed at a slower rate than in previous years.

Territorial Department of Social Welfare

This Department provides a complete social welfare program in the Yukon to non-Indians and extends its Family and Child Welfare Services to Indians by virtue of an agreement with Indian Affairs Branch. Probation Services to juvenile and adult offenders were also provided by the Department during the year.

Liquor Department

Total sales to January 31st, 1966, show a slight increase. Sales for the period from April 1st, 1965, to January 31st, 1966, amounted to \$2,152,262.01 as compared to \$2,016,766.89 for the corresponding period April 1st, 1964, to January 31st, 1965, an increase of \$135,495.12.

Public Health

Extension and co-ordination of First Aid and emergency medical evacuation arrangements have received priority and were actively pursued during the year. Provision commencing 1 April, 1965, has been made for financial subsidization of the costs of emergency transportation of sick and injured from outlying areas to the nearest medical centre.

In the four fields of particular public health interest underlying Territorial financial responsibility, namely Control of Cancer, Venereal Disease Control, Control of Tuberculosis, and application of the Insane Persons Ordinance, there were reported 31 cases of Cancer, 9 new and reactivated cases of tuberculosis, 10 committals for psychiatric treatment during the year.

The School Dental Pilot Project was extended according to plan to include all Grade II students in the City of Whitehorse and further work was conducted at Carcross.

Territorial Department of Game

There were a total of 260 non-resident big game hunters licensed in the Yukon during the 1965 hunting season, this being an increase of 50 hunters over the 1964 season, and an increase of 82 hunters over the 1963 season. The above figure is made up of 234 Alien hunters and 26 Canadian hunters.

As the market price of fur was quite high in the early winter of 1965, renewed activity has been shown by trappers; and traplines, especially adjacent to any settlement, are eagerly sought after. We have over 300 active registered traplines.

Department of Territorial Treasurer

The Public Accounts of the Territory for the fiscal year ending March 31, 1966 will, when available, reflect the expansion of Territorial Government services that has been experienced in recent years. Budgetary expenditures is expected to be as follows:

Operation and Maintenance	6,793,182.00
Project and Loan Capital	2,569,902.00
Loan Amortization	232,762.00

Revenue and recoveries are expected to be as follows:

Operation and Maintenance	4,783,697.00
Project and Loan Capital	930,689.00
Loan Amortization	43,453.00

The operating deficit grant receivable from the Federal Government will amount to \$2,111,263.00 and the loan amortization grant will amount to \$518,900.00. Current surplus is expected to be in deficit to the extent of \$3,897,345.00 offset by loan amortization grants to be received totalling \$6,998,388.00.

Plans for 1966

Public Works

The program for 1966/67 includes building construction projects valued at \$425,000.00 and road construction projects totalling about \$1,000,000.00.

Welfare

Plans for the construction in 1965 of the Department's first Children's Group Home were deferred. Construction will commence in May, 1966, and the Home should be ready for occupancy by the fall of that year.

The alcoholism program presently operated by the Alberta Division of Alcoholism on behalf of the Yukon Government will be taken over by the Territorial Government on February 15, 1966.

A new Department, separate from the Social Welfare Department, will be established to administer the Yukon's new Corrections Program. The Probation Services presently administered by the Department of Social Welfare, will be transferred to the new Department on April 1, 1966.

Regional Library

The Regional Library continued to expand its services during 1965. More than 20,000 books were shipped to community, school and camp libraries and other services such as reference and inter-library loan were greatly increased.

The major library project of the year was the planning and construction of a new Regional Library Headquarters, to be opened in January, 1966. The new building will house both Regional Headquarters and the Whitehorse Branch Library and will provide a number of other facilities such as a small art gallery, a music room, meeting room for the use of cultural groups and a fireproof room for the library's growing collection of Yukoniana.

NORTHERN ADMINISTRATION BRANCH

Responsibilities Branch Headquarters in Ottawa has six Divisions and two major support sections, namely Personnel and Housing, which carry out the staff, advisory, planning, and co-ordinating functions connected with the implementation of departmental policies. Responsibilities are detailed below.

Education Division

Development and operation of a school system for the Northwest Territories (outside the organized school districts in Yellowknife and Hay River) and Arctic Quebec. Provision of vocational education including a placement service and adult education in these areas. Operation of combined vocational high schools and pupil residences in Yellowknife and Fort Churchill, Manitoba. Responsibility for other pupil residences in the Territories, which are operated under contract by the Roman Catholic and Anglican Missions. Administration of assistance programs for higher education.

Engineering Division

Planning for and design of structures; construction and maintenance of roads, buildings, and utilities; operation of power plants, water and sewerage systems, heating plants, and other electrical and mechanical equipment, provision of engineering assistance for settlement and town planning; site and soil investigations, investigation of northern building problems; provision of engineering assistance to the government of the Northwest Territories and the Yukon Territories.

Industrial Division

Improvement of economic conditions by encouraging better harvesting of food resources, developing cottage industries and co-operatives. Area surveys of renewable resources on which to base projects. Development of the tourist industry in the Northwest Territories and broad programs of assistance to industry.

Territorial Division

Provision of administrative assistance to the Government of the Northwest Territories; acting for the Government on the negotiation of federal-territorial financial arrangements; administration of Territorial Ordinances; provision of advisory services on Yukon affairs; specific activities in the Northwest Territories including game management, hospital insurance, labour, municipal affairs, liquor management, forest management and administration of territorial lands. The latter two categories of activities are carried out in relation to both the Yukon and the Northwest Territories.

Welfare Division

Provision of welfare services to all residents of the Northwest Territories, other than Registered Indians, on behalf of the Federal and Territorial Governments, and to the Eskimos of Arctic Quebec and Manitoba. Operation of Children's Receiving Homes at Yellowknife and Fort Smith, a Home for the Aged at Aklavik and of transit centres at various northern points. The development and operation of a Corrections Service in the Northwest Territories. Provision of Eskimo-English translation service. Provision of housing for needy families. Provision of advice on Yukon Welfare matters as required.

Finance and Management Advisory Division

This Division is responsible for financial and accounting systems, co-ordinating northern transport and supply, administration procedures, and the provision at Ottawa of office services.

Field Organization - Northwest Territories

The field organization is divided into two administrative Districts. The Mackenzie District, with headquarters at Fort Smith, has three Regional offices supervising eight administrative areas. The Arctic District, with headquarters in Ottawa, is made up of three Regions containing a total of sixteen areas. The Area Administrator reports to the Region Administrator; the Region Administrator reports to the District Administrator; and the District Administrator reports to Headquarters in Ottawa.

Long-term Plans

Branch decentralization, which began several years ago, is to be continued. By this process, administrative authority and responsibility are being transferred from Branch Headquarters to the District offices, and in turn

to the Region and Area offices. The Branch will continue to serve the Yukon Territory as required.

In connection with the development of a more independent status for the Northwest Territories, the Branch must provide administration for a series of transitional stages toward Territorial self-government, and must establish an administrative system which can be taken over gradually by the developing territorial government. More specific plans are given below, under the heading of the various Divisions.

Education

To expand academic, technical, and vocational training programs, and to increase new school construction to provide facilities for the entire school-age population of the north. Vocational guidance and placement services will be expanded. Education beyond the secondary school level is being encouraged by a program of financial literacy for Indians, Eskimos and will have a considerably larger staff.

Engineering

To meet the requirements of the Department of Northern Affairs and National Resources by planning and providing more economical and attractive buildings, and constructing roads to permit easier access to natural resources in the north.

Industrial

To improve the economic circumstances of local peoples through area planning studies, investigation of improved methods for harvesting food resources, market research, and the development of co-operative enterprises, cottage industries, and low-cost housing. The possibilities of assisting local people to establish small businesses and industries is to be studied intensively.

Territorial

To continue to give assistance to the governments of the Territories and to promote their responsibilities. To develop a management plan for Canada's northern forests and to encourage the development and utilization of the forested areas by forest based industry and for recreational purposes by the public. Continue to recommend policy for the disposal of Crown lands in the Northern Territories, and to exercise functional supervision of the application of that policy.

Welfare

To develop suitable programs of social security, public assistance, and related services for family and child welfare; to assist native people in meeting economic and social changes associated with the decline of traditional ways of life, and with the shift to wage employment and life in the settlements; to encourage citizen participation in the solution of local community problems, and in the general management of community affairs; to promote the social, economic, and cultural advancement of northern peoples.

Review of 1965 Operations

Education

All existing educational facilities and programs in the Mackenzie District, the Arctic District and in Arctic Quebec were continued. The elimination of illiteracy among Eskimos and Indians was a primary objective. Higher education assistance was expanded considerably and vocational training both inside the Territories and at institutions in the provinces was increased considerably.

An apprenticeship program made good progress.

Engineering

Standards for electrical service installations have been set up so that continuing maintenance, expansion and replacement will be facilitated. A number of house-sized recirculating sewage systems have been installed on an experimental basis for study at Cape Dorset and elsewhere. Land division layout and zoning, and legal land surveys were completed at Whale Cove, Eskimo Point, Coral Harbour, Pangnirtung and Pond Inlet. On-site engineering planning studies has been carried on for eight sites, including Broughton Island, Rae, Enterprise, Hay River, Cambridge Bay, Clyde, Igloolik and Inuvik. A number of buildings were purchased including 252 houses of different sizes, 8 portable classrooms, 6 power houses and extensions. Construction of larger buildings was arranged through the Department of Public Works. Two river bridges were completed during the year and diesel generators were installed in a number of settlements to meet the requirements of increased consumption.

The construction of a water and sewer system was commenced at Aklavik. Additional fire-fighting facilities, including buildings and equipment were purchased. The McCabe and Minto bridges were replaced in the Yukon and six other bridges were replaced along the Stewart Crossing-Dawson Road. The Watson Lake-Ross River Road construction project was completed between Mile 144 and Mile 172. A survey was carried out on the first 37 miles of the Boundary Road and approximately 10 miles of road was completed on the Ross River-Carmacks Road.

Industrial Division

The operation of various projects was continued and assistance given to co-operatives and cottage industries. Area resource utilization planning was continued. The Division also helped organize a new private non-profit company called Canadian Arctic Producers which has taken over responsibility for the marketing of Eskimo arts and crafts, formerly handled by the Division.

Territorial Division

Assistance to the Governments of the Yukon and Northwest Territories was continued. The Division took a central role in Federal-Territorial financial arrangements for both Territories, administration of Northwest Territories Ordinances, provision of advisory services on Yukon affairs, specific activities in the Northwest Territories, including game management, hospital insurance, labour, municipal affairs, liquor management, forest management and administration of Territorial lands.

The latter two categories of activities are carried out in relation to both the Yukon and the Northwest Territories.

Welfare

Developed suitable programs of social security, public assistance, and related services for family and child welfare, assisted native people in meeting economic and social changes associated with the decline of traditional ways of life, and with the shift to wage employment and life in the settlements, encouraged citizen participation in the solution of local community problems.

Plans for 1966

Planning for 1966 is directed towards the long range goals outlined above. Progress in decentralization of the administration of Territorial affairs will be accelerated particularly in the Northwest Territories. Federal-Territorial Financial Agreements will be negotiated with both Territories for the 1967-72 period. More detailed plans are given in the sections on the Districts.

THE ADMINISTRATOR OF THE ARCTIC

Responsibilities To implement in the Arctic District the policies of the Department as directed by the Northern Administration Branch headquarters.

Long-term Plans

Long-term plans are dependent on Departmental policy.

Review of 1965 Operations

Organization

Three Regional Headquarters were maintained. The Regional Office at Churchill supervised area offices at Eskimo Point, Whale Cove, Rankin Inlet, Baker Lake and Coral Harbour. The Regional Office at Frobisher Bay supervised offices at Cape Dorset, Igloolik, Pond Inlet and Pangnirtung. The Regional Headquarters for Arctic Quebec continued to operate in Ottawa, supervising area offices at Great Whale River (Poste-de-la-Baleine), Port Harrison (Inoucdjouac), Povungnituk, Sugluk (Saglouc) and Fort Chimo.

Administration

Welfare and Educational Services expanded during the year and additional industrial projects were undertaken. A rental housing program was approved in October, 1965. This program will enable all Eskimos to obtain housing adequate for their needs at a rental based on their ability to pay. Over a five-year period approximately 1300 houses will be provided in the Eastern Arctic. The concept is that each house will be serviced with electricity (where available), fuel oil, sewage and water, and basic maintenance.

Economy of the District

In keeping with the aims of the Advisory Commission on the Development of Government in the Northwest Territories, local Eskimo councils have been and are being encouraged to take an active, indeed a dominant role in community development. As of April 1, 1965, \$82,500 was made available for community development projects in the Arctic District.

Production of arts and crafts caused a noticeable rise in the local economy throughout the Arctic District. Crafts programs at Rankin Inlet and Baker Lake reached a monthly figure of \$16,000.00. New ideas such as ceramics were introduced and received very favourable comments from critics in the south.

In February the Commissioner and Council of the Northwest Territories approved an Ordinance Respecting Travel, Tourist Establishments and Outdoor Recreation, thereby establishing the first legislative control to be placed on the developing tourist industry.

Education

One hundred and one elementary classrooms, one high school classroom, one special classroom, and three vocational shops were in operation in 31 schools. Total enrolment was 2,272 students, comprising 2,086 Eskimos, 38 Indians and 148 others. This includes those attending the pre-vocational school operating at Churchill, Manitoba. In addition, 89 Eskimos from the Territories, Arctic Quebec and Akudlik (Eskimo village at Churchill) attended the Duke of Edinburgh School at Churchill, Manitoba.

Vocational training was carried out in the Territories in power plant operation, carpentry, caretaking, sawmill operation, oil-burner maintenance and fish filleting. Seventy-two Eskimos were brought to southern schools for training in the following occupations: heavy equipment operations, outboard motor repair, barbering, carpentry and clerical work. Eighteen other Eskimo children were given academic courses in southern centres. Two blind and 3 deaf children also came out for attendance at special schools in the provinces, and 4 Eskimo pupils of exceptionally high aptitude came south for the school year 1965-66.

Adult education continued throughout the Eastern Arctic and 450 - 600 Eskimos participated in these classes during the year.

Engineering

In 1965 the Department of Northern Affairs and National Resources took control of crown-owned housing in Frobisher Bay. Water, sewage and garbage services are operating efficiently, and employing 16 Eskimos as drivers and labourers.

Regular cleaning services for Federal buildings at Frobisher Bay is done under contract and employs 95% Eskimo Staff.

Last year it was reported that Phase 1 of the original development plan for Frobisher Bay had been completed with the construction of the new hospital and water treatment plant. Additional work was undertaken late this year under the supervision of the Northern Canada Power Commission. It included the extension of the steam line from the central heating plant to service the Federal building complex. The new water line from the water treatment plant was also extended to this area. This will permit maximum use of the new facilities and reduce unnecessary duplication of service in the community.

Radio beacons were installed by Department of Transport at Arctic Bay, Pangnirtung, Payne Bay, Pond Inlet and Grise Fiord. They provide a most useful and welcome navigational aid to all pilots flying in the area.

The former community of Port Burwell consisting of some 25 buildings was relocated to a new site at Fox Harbour approximately one mile away. All Eskimo residences were dismantled and re-erected on gravel pads.

Seventy-five per cent of the reconstruction of utilities at Rankin Inlet, another services improvement project, was completed. It includes the construction of a dyke and reservoir with sufficient capacity to hold one and one half years' water supply and the revamping of the heating system in the settlement to suit the revised services distribution lines.

The Bell Telephone Company established a radio-telephone system in the Keewatin Region, with Churchill as the key centre. This system now has links with all telephone systems across Canada.

The Department of Public Works, on behalf of Northern Affairs, undertook the annual construction programs at Pangnirtung and Pond Inlet. A contract for \$1,131,000 was let to Ron Engineering, the low bidder. It was a firm price contract covering a school addition, house, office/transient quarters and a warehouse at Pangnirtung; a new school, 3 hostels, 2 houses, office/transient quarters and warehouse at Pond Inlet.

Industrial

One American and three Canadian companies conducted outfitter operations through the Keewatin as far north as Chantrey Inlet fishing for lake trout,

sea trout and Arctic char, while another Canadian company started in outfitter operation to the Belcher Islands. An Eskimo at George River (Port-Nouveau) with the aid of an Eskimo Loan completed the purchase of materials for and the erection of a small sport-fishing lodge about twelve miles upriver from Ungava Bay. He received the support and co-operation of the Provincial and Federal Governments.

Co-operatives in the District made rapid strides during the year.

Trapping projects were carried on at Rankin Inlet and Whale Cove to assist the trappers to locate traplines in good fur-producing areas.

Logging projects were continued at Port-Nouveau and Fort-Chimo, Quebec. The produce was used for local sales or stockpiled for further requirements. A new logging project and sawmill operation was started at Poste-de-la-Baleine.

Welfare

Approximately 500 Eskimos were repatriated to Baffin Island and Arctic Quebec after discharge from Hospitals in Eastern Canada. Several hundred more were returned to Keewatin. Transient facilities at Churchill and Frobisher Bay were used extensively throughout the year.

Case-work service was provided to most of the Eskimos in the south. This included several hundred personal interviews with tubercular patients in Moose Factory, Roberval and Weston. Approximately 80 Eskimos undergoing treatment in Montreal for conditions other than tuberculosis were also served. Prisoners at the Rideau Industrial Farm were visited as were all retarded children in the south. Reports and photographs were sent to their relatives. A constant review was carried out to determine if the Eskimo children in southern foster homes could be returned to the north. The social workers in the north assisted with problems of chronic truancy and community council work, and helped the courts in dealing with non-support charges and other problems. Plans for the retraining of two blind Eskimos and rehabilitation plans for ex-psychiatric patients were made.

A social worker and assistant accompanied the Eastern Arctic Medical Patrol aboard the C.C.G.S. "C.D. Howe", which visited 32 settlements and remote Eskimo camps in the period of ten weeks, and gave medical and dental service to 2,923 Eskimos from a total population of 3,392. The dental work consisted of 478 restorations and 862 extractions. The

social worker planned the evacuation of 37 Eskimos, 35 with suspected tuberculosis and 2 for other medical conditions; of these 13 were evacuated by ship and 24 direct from the settlement by aircraft. The medical officers recommended 54 persons to be evacuated later for treatment of non-tubercular conditions. An occupational therapy program was provided for patients on board the ship. Reports were made to relatives of patients in southern hospitals. Twelve Reports were made to relatives of patients in southern hospitals. Twelve tons of dog food donated by the Ontario Humane Society were distributed in the settlements and in caches at outlying Eskimo camps for emergency feeding.

The Welfare Arts and Crafts program was continued and resulted in approximately \$70,000.00 being paid to Eskimo artists.

Plans for 1966

Present plans call for more decentralization of responsibility and authority to regions and areas. New management techniques are aimed in this direction and the recommendations of the Advisory Commission on the Development of Government in the Northwest Territories will no doubt be of greatest importance in this regard. Strengthening of administrative responsibilities in the Eastern Arctic is expected by the re-opening of area offices at Broughton Island and Whale Cove, which have been without area administrators during the past year, and the opening of an area office at Resolute Bay.

With the expanded facilities for education and training it is hoped that in 1966 and in future years more Eskimos will go back to the north with sufficient academic and technical knowledge to avail themselves of employment opportunities.

Versafood Limited will continue catering for single men's messing at Frobisher Bay, but as of April 1, their contract will be with Northern Affairs rather than Transport. The physical handover of responsibility from the Department of Transport to Northern Affairs for all townsites road maintenance at Frobisher Bay is planned to take place on June 1.

Town planning and water and sewer investigations will continue at Lake Harbour, Arctic Bay, Resolute Bay, Rankin Inlet, Eskimo Point and Repulse Bay.

The education construction program will be accelerated with new classroom construction to take place at Arctic Bay, Baker Lake, Chesterfield Inlet, Eskimo Point, Igloodik, Pangnirtung, Pond Inlet and Whale Cove, and plans

will be made for additional classes at various locations with construction of 41 classrooms during the next two years. One hundred and ninety-four 3-bedroom Eskimo houses are to be purchased, shipped and erected throughout the Baffin Region during the first year of the five-year rental housing program, and an additional 20 units for indigent and welfare persons throughout the district are being manufactured at the present time. The engineering staff will have to assess the impact of the rental housing program on the provision of municipal services in all communities, and considerable planning must take place before these services can be extended to the new houses.

Bulk oil storage facilities will be expanded at Pond Inlet and Baker Lake and extended to Grise Fiord.

The fish processing plant formerly at Daly Bay to be relocated at Rankin Inlet will be geared to handle Arctic char obtained from the whole area between Eskimo Point and Daly Bay. In addition to char, lake trout from the inland lakes will be processed. In conjunction with the fish processing, muktuk, whale and seal meat will also be canned at Whale Cove to supply the ever-increasing demands for Arctic produced specialty foods. The by-product of the whale and seal canning projects will continue to be manufactured into dog food and rendered oils for resale to resource-depressed areas.

Long range welfare programs will be continued with greater emphasis on child welfare, including adoptions and child protection.

THE ADMINISTRATOR OF THE MACKENZIE

Responsibilities To implement in the Mackenzie District the policies and programs of the Department, as directed by the Northern Administration Branch Headquarters.

Long-term Plans

Long-term plans are dependent on Departmental policy.

Review of 1965 Operations

Organization

The Mackenzie District Office is located at Fort Smith, N.W.T. Three Regional Offices report to the District Office (Fort Smith, Yellowknife and Inuvik). The Regional Office at Fort Smith supervised area offices in Hay River and Fort Simpson. The Regional Headquarters in Yellowknife supervised area offices in Coppermine, Cambridge Bay and Spence Bay. The Inuvik Regional Office supervised area offices in Aklavik and Tuktoyaktuk.

Land and Municipal Affairs

The town of Hay River and Yellowknife were very active in land zoning subdivision and capital construction. Community associations were incorporated in five more communities, bringing to twenty-two the number of settlements within the District having such associations. Capital construction or improvements to community centres were carried out at seven settlements. In 1965 there was a sharp decrease in the number of mortgages approved under the Ordinance to assist the construction of low cost houses.

Forestry

Fire suppression costs were the lowest in many years. In an expanded protected area, 109 fires burned 9,203 acres of Crown land at a total cost of \$341,901. This is a decrease of \$151,000 from 1964.

Game

The value of fur production was down by approximately 15% from 1964. The muskrat take increased by some 10% although average values were down 10%. Marten take was down 45%. The seal harvest was much higher than in previous years, causing the price of sealskins to drop as low as \$4.00 in August. A good caribou calf crop was observed and the physical condition of the animals was good. The Slave River area and Wood Buffalo National Park were free from anthrax; vaccination against anthrax was carried out in both areas in the late spring.

Education Programs

Enrolment in Federal Schools at the commencement of the 1965-66 school term was 4,050 students. Schools operated by the Public School District at Yellowknife and Separate School Districts at Yellowknife and Hay River had 901 students enrolled, for a total of 4,951 students in the schools of the District. This is an increase of more than 6% over 1964.

There were a total of 258 classrooms: 155 elementary, 59 high school (grades 7 to 12) and 44 special. A new 4-room school was opened at Pine Point, replacing the temporary classrooms occupied during the previous year. A 2-room school opened at Holman Island.

Thirty-eight students from the District received financial assistance to attend universities under the Territorial higher education plan. A total of 62 students were assisted in attending vocational courses outside the Territories, mostly in Alberta. Vocational courses were offered at locations within the District, and were attended by 90 trainees.

Twenty-seven apprentices were given financial assistance toward attending theory courses at institutes in the provinces, as part of their apprenticeship.

Industrial Programs

The fishing projects carried out in past years in the Mackenzie Delta were partially suspended in 1965 as commercial interests investigated the possibilities in this field. The company met with reasonable success. At Cambridge Bay a Projects Officer was appointed in time to supervise the summer char fishery in Wellington Bay. Further gains were shown in the fur garment industry and the Fur Garment Shop at Tuktoyaktuk increased its sales and production.

The latest figures available show an encouraging increase in tourists visiting the Mackenzie District.

Welfare Programs

Highlight of the year was the success of the Community Development Fund for promoting projects such as spring clean-ups that are recommended by the community council or association. In co-operation with Industrial and other Sections, other community self-help projects such as the Resolution Lumber Co-operative operated successfully. The Rehabilitation Centre at Inuvik ceased operation early in the year.

Under the Social Assistance Program, additional employment opportunities resulted in a decrease in over-all social assistance costs. The decrease was more noticeable in territorial social assistance than in federal assistance to Eskimos.

Expansion of the Child Welfare Program has been necessary because problems of child neglect are either increasing or they are being brought more forcibly to the attention of social workers. A marked rise in adoptions was recorded this year.

Under the Correctional Services Program planning and construction continued on the medium security prison at Yellowknife and the juvenile detention home at Fort Smith. Since no juvenile detention facilities are yet available for children committed to care by the courts, outside resources are being used.

Engineering

In July 1965, Northern Affairs turned over the water and sewer installation to the Village of Fort Smith. At Hay River, contracts were arranged for construction of water intake and water mains to service the industrial area on Vale Island and the mainland subdivision.

Fire suppression equipment was provided and other fire prevention work carried out at the settlements of Aklavik, Fort Simpson, Fort Norman, Lac La Martre, Snowdrift, Arctic Red River, Fort Good Hope, Fort Providence and Coppermine. A call for tenders was issued for the Pine Point Fire Hall.

Major building projects now completed include:

- 14 - 3 Bedroom houses
 - 8 - Atco temporary units purchased
 - 1 - 4 Apartment Building for N.C.P.C. staff
 - 6 - Low cost houses
 - 1 - Office and transient building for R.C.M.P.
 - 2 - 2-Bay Garages
 - 5 - Power houses with distribution systems
 - 8 - Heated warehouses
 - 2 - Fire towers and cabins
- and extensive alterations and additions to over 25 buildings throughout the District.

On the Fort Smith Highway, the Hay River and Buffalo River bridges were completed. Clearing of the Pine Point-Resolution Road right-of-way was being carried out as a day-labour project at the end of the year.

Plans for 1966

Area offices will be opened at Pine Point and Fort McPherson.

Preliminary steps will be taken to prepare the settlement of Inuvik to become an incorporated municipality in 1967.

A complete municipal real property assessment program will be inaugurated.

Housing co-operatives are planned for the communities of Aklavik, Resolution and Yellowknife patterned after the successful Inuit Co-operative Association of Inuvik. Despite a probable increase in the interest rate from 7 1/4% to 7 3/4%, these co-operatives should provide about twenty approvals.

A more concentrated effort will be made in the field of fire prevention education. In the three high-risk areas - Yellowknife, Rae and Resolution - this campaign will probably be conducted in the native languages as well as English. By 1967 the forestry radio network should be completed, allowing single side band communication between all fifteen main stations in the District.

An expansion in the Adult Education program, and commencement of kindergarten classes as part of the school program (space permitting), are planned.

School projects to be commenced during 1966 are: construction of new schools and hostels at Cambridge Bay and at Rae, construction of additions to Sir John Franklin School and Akaitcho Hall in Yellowknife,

a new school at Inuvik, an addition to the school at Fort Good Hope as well as a 60-bed hostel.

The Welfare Correctional Program will expand upon completion of the Fort Smith juvenile detention home and the Yellowknife prison and minimum security camps at Yellowknife is also expected to be completed. Community development programs will also be established or expanded. Construction of buildings and receiving homes will begin in 1966 at Hay River and Inuvik.

Municipal services, including water and sewage systems, garbage collection and fire prevention are to be installed in several of the smaller settlements and improved in all settlements.

The cost of the Road Program proposed for fiscal year 1966-67 is estimated to be \$4,650,500. Highlights will be:

- Work on the Fort Smith Highway will continue with crushed rock surfacing to be completed as far as Mile 38, gravel as far as Mile 158 and construction of two more bridges.
- Extension of the Mackenzie Highway 50 miles toward Fort Simpson (first year of two year contract).
- To construct the grade between Little Buffalo River and Resolution.
- Continue construction on Ingraham Trail as far as mile 80 (first year of two year contract).
- Other construction work at Yellowknife, (airport road) Fort Simpson and Hay River.

RESOURCE MANAGEMENT DIVISION

Responsibilities To formulate and recommend policies designed to encourage resource exploration and development and to provide terms of disposal of mineral rights to private industry which will maintain an optimum level of development;

The management and administration of Crown mineral rights in the Yukon and Northwest Territories;

To evaluate specific natural resource exploration and development projects to determine whether they qualify for existing assistance programs and/or government support in other areas;

To assess national fiscal policies and subsidy programs in relation to their affect on northern natural resource development;

To administer safety Acts and Ordinances in relation to mineral extraction industries.

Review of 1965 Operations

OIL AND GAS

Land Disposition

A total of 752 Canada Oil and Gas Permits covering 36,639,911 acres were issued; of this, 444 permits covering 22,110,565 acres were in the continental Northwest Territories; 194 permits covering 8,641,323 acres were in the Arctic Islands of the N.W.T.; 90 permits covering 4,933,562 acres were off the Arctic Coast and 24 permits covering 954,371 acres were in the Yukon Territory. The total acreage under permit and lease on December 31, 1965, was as follows:

Permits

Northwest Territories (mainland).....	1,266	59,419,535
Arctic Islands (N.W.T.).....	1,127	51,738,025
Yukon (mainland).....	314	14,328,858
Arctic Coast.....	194	9,221,639
		<hr/>
T O T A L		134,708,057

Leases

Northwest Territories (mainland).....	104	674,504
Yukon (mainland).....	9	32,933
		<hr/>
T O T A L	113	707,437

Three cash bonus permit sales were held during the year. A total of 37 permits were sold realizing \$918,201.86.

Thirty-one blocks covering 167 grid areas were disposed of, realizing a work bonus commitment totalling \$1,165,760.67. A work bonus must be expended on exploratory work during the first term of a permit in order that the permittee may obtain a refund of the bonus.

Exploration

Mainland

Sixteen geological field parties carried out extensive surface investigations in the sedimentary ranges of the Mackenzie and Richardson Mountains in the Northwest Territories, in the Eagle Plain in the Yukon, in the Hudson Bay Lowlands, and along the west coast of British Columbia. Helicopter and fixed wing support aircraft have reached their maximum utilization, with supplies and personnel being transported to and from the field by plane and surface investigations being carried out by helicopter-supported parties.

In the Hudson Bay area, a geological party investigated outcrops along the coast and in river valleys. Another party specializing in underwater surveys, spent approximately one month collecting samples along the sea-bottom. A conventional seismic survey and gas exploder survey were run to assist in the interpretation of structures and the determination of the thickness of sediments. In addition, an aeromagnetometer survey was conducted covering approximately the west half of Hudson Bay.

Light, mobile seismic equipment adapted for transport by helicopter continued to be utilized over muskeg and highly dissected terrain during the summer months. In 1965, three companies used this kind of equipment in the Northwest Territories and Yukon. Although the operational costs are higher than conventional seismic methods on a daily basis, on a mileage basis costs are comparable due to the increase in production. Furthermore, operations can be carried out continually during the whole year. In previous years all geophysical operations were restricted to winter months.

A new record in "footage drilled" on Canada lands was set in 1965. Eighteen wells, totalling approximately 121,000 feet, were completed or abandoned. The results were encouraging - one well was completed as a gas discovery in the Liard area of the Northwest Territories, and one gas well and one oil well were completed in the southern part of the Eagle Plain.

Arctic Islands

Three geological parties conducted surface investigations in the Arctic Archipelago.

An aeromagnetometer survey by Hunting Survey Corporation covering most of the central and western islands was completed during the year. Oil companies holding permits in the islands covered by the survey can purchase this data for work credit purposes.

Publications

The fourth Schedule of Wells 1962-64 was completed in 1965. This Schedule contained geological and drill stem test information on wells completed to the end of 1962, and non-confidential data on all wells completed in 1963-64. Various specialized maps were printed for sale to the public, and information circulars were distributed to the oil industry.

MINING

Northwest Territories

Since completion of the Great Slave Railway to Pine Point and Hay River in 1964, considerable interest has been shown in the areas surrounding Great Slave Lake and particularly in the Pine Point area. Over 70 mining companies acquired claims surrounding Pine Point Mines and have embarked on accelerated exploratory programs consisting of geophysical, geochemical surveys and diamond drilling of anomalous areas. Late in October 1964, reports of a discovery of high grade lead-zinc ore on a property adjoining claims of Pine Point Mines Ltd. were made. This sparked the largest staking rush in the history of northern mining which has been surpassed only by the Timmins rush in 1964; the largest in Canadian mining. From October 1st to December 31st, 1965, over 11,000 claims were recorded in the Yellowknife office. In view, of the encouraging results obtained to date, this area will be very thoroughly examined in the next few years.

Activity in other areas while overshadowed by the activity at Pine Point was also at a high level. Baffinland Iron Mines continued working on its high grade iron showings on Baffin Island. The main program was a continuation of a feasibility study. At the property itself, a 65 mile road was completed from the base camp at Mary River to the harbour site at Milne Inlet. An airstrip was also completed at each of these sites (the federal government contributed 50% of the cost of construction) and detailed surveys were made of a proposed railway route to Milne Inlet as well as of the proposed townsite and harbour area. Closely spaced diamond drilling was also performed on the No. 1 zone and bulk samples shipped out for test purposes.

Anglo United Development conducted a diamond drill program on a gold showing in the Snare River area and Gunnex examined and drilled a gold find made in 1964 at Clan Lake north of Yellowknife. Consolidated Mining and Smelting Company entered into an agreement with Bankeno Mines Ltd. to do work on a lead-zinc showing on Little Cornwallis Island.

Fort Reliance Minerals conducted a geophysical survey on copper showings in the east arm of Great Slave Lake. Rayrock Mines did a diamond drill program to probe the possibilities of lead-zinc mineralization on a favourable formation at Sulphur Bay on the western shore of Great Slave Lake. The James River Syndicate and McIntyre Mines worked on gold showings near Coronation Gulf on the Arctic Coast.

Roberts Mining had prospecting parties working in several areas throughout the Northwest Territories.

The following are preliminary figures of mineral claims recorded during 1965 and comparative figures for 1964:

<u>Mining District</u>	<u>1964</u>	<u>1965</u>
Mackenzie	3,949	14,985
Nahanni	76	104
Arctic & Hudson Bay	352	501
	<hr/>	<hr/>
TOTAL	<u>4,377</u>	<u>15,390</u>

The value of mineral output in 1965 quadrupled the output for 1964 and was mainly due to the production from Pine Point Mines.

Pine Point Mines Ltd. continued to ship highgrade lead-zinc ore to smelters throughout the year. The concentrator was completed and in operation in November with the first shipment of concentrates to leave the property on November 29, 1965.

Production at the four producing gold mines, namely, Giant Yellowknife Mines, Con-Rycon - Vol. Discovery and Tundra Gold Mines continued at a normal rate. However, because of higher grade ore milled the value of gold production exceeded the 1964 figure by 20 per cent.

Silver production showed an increase of 100% and was mainly due to the production from Echo Bay Mines on Great Bear Lake who operated a full year. This Company also accounted for all the copper production during the 1965 season.

Canada Tungsten continued mining and milling on its tungsten property in the Flat River area.

The following table gives preliminary production figures for 1965 and comparative figures for 1964, it is predicted that value of Mineral Production in 1966 in the Northwest Territories will reach \$90,000,000.00.

TABLE 1
MINERAL PRODUCTION

NORTHWEST TERRITORIES

<u>Mineral</u>	<u>Quantity</u>		<u>Value</u>	
	<u>1964</u>	<u>1965*</u>	<u>1964</u>	<u>1965*</u>
Gold	412,879 ozs.	452,000 ozs.	\$15,586,182	\$17,053,960
Silver	65,223 ozs.	1,274,200 ozs.	91,312	1,782,606
Lead	6,125,588 lbs.	156,724,000 lbs.	823,279	24,292,220
Zinc	7,840,620 lbs.	187,125,000 lbs.	1,111,016	28,255,875
Tungsten	Not available		Not available	
Copper		850,000 lbs.		319,600
Cadmium		240,000 lbs.		667,200
TOTAL			17,611,789	72,371,461

*Preliminary Figures

YUKON TERRITORY

Dynasty Explorations Ltd. who acquired a large number of claims in the Ross River area adjoining the Vangorda lead-zinc deposits was the most active mining company doing exploration work in the Yukon during 1965. Geophysical and geochemical surveys were conducted over widespread areas and many anomalies were found some of which were diamond drilled with very encouraging results. This started a staking rush into this area late in the season and by year's end some 4,000 additional claims were reported as having been staked.

Kerr Addison Mines Ltd., who own the Vangorda property where approximately 9,000,000 tons of high grade lead-zinc has been blocked out, commenced a diamond drill program on a second anomaly on its Swim Lake property. The combined efforts of Dynasty and Kerr-Addison indicate good tonnage possibilities of lead-zinc ore in this area.

In the Whitehorse copper belt, New Imperial Mines Ltd. continued diamond drilling and have now an estimated 6,000,000 tons of copper ore outlined. A feasibility study was made and recently the Company announced production plans for this property. An agreement was reached with a Japanese firm to bring this property into production as soon as possible.

In the Mount Nansen area west of Carmacks, Mount Nansen Mines conducted underground lateral development and diamond drilling on its gold property. Some 4,500 feet of drifting and cross-cutting has been completed to date.

Yukon Antimony Corporation concentrated mainly on providing access to its property on Carbon Hill by the construction of a bridge over the Wheaton River and work on an access road. A limited amount of diamond drilling was completed which indicated good values in antimony.

In the Dawson area, Cassiar Asbestos Corporation has announced production plans for its asbestos property in Clinton Creek. Work has commenced on a connecting road from the property to the Dawson-Sixty Mile Road. The federal government is participating financially in the construction of this access road under its northern roads program. This includes reconstruction of the Dawson - Sixty Mile Road, an access road to the property and construction of a bridge over the Forty Mile River, the government portion of cost will be up to a maximum of \$2,783,000.00.

The following preliminary figures show the claims recorded during 1965 with comparative figures for 1964:

<u>Mining District</u>	<u>1964</u>	<u>1965</u>
Whitehorse	1,409	5,508
Mayo	541	899
Dawson	140	297
Watson Lake	349	698
	<hr/>	<hr/>
T O T A L	2,439	7,402
	<hr/>	<hr/>

The value of mineral production in the Yukon dropped 13 per cent over the 1964 figures for two reasons; Firstly, Yukon Consolidated Gold Corporation, who plan on phasing out its dredging operations in 1966, had already started to cut back. During 1965 the Company only had four dredges in operation and employed some 200 men as compared with six dredges and 280 men in 1964; Secondly, United Keno Hill Mines was forced to cut its production because of a manpower shortage. Its daily average tons milled dropped from 500 to 400 tons per day, and its labour force dropped from 650 men in 1964 to 545 men in 1965.

Discovery Mines opened its gold mine in the Mount Freegold area commencing production in June but had not reached its full operating capacity by the years end.

Yukon Coal Company continued normal production throughout the year.

The following preliminary table shows the quantity and value of mineral output in the Yukon for 1965 and comparative figures for 1964:

TABLE 11

YUKON TERRITORY

<u>Mineral</u>	<u>Quantity</u>		<u>Value</u>	
	<u>1964</u>	<u>1965*</u>	<u>1964</u>	<u>1965</u>
Gold	57,844 ozs.	46,878 ozs.	\$2,183,611	\$1,768,707
Silver	5,638,712 ozs.	4,495,121 ozs.	7,894,196	6,288,674
Lead	20,418,415 lbs.	17,015,000 lbs.	2,744,835	2,637,325
Zinc	13,094,653 lbs.	14,000,000 lbs.	1,855,512	2,114,000
Cadmium	132,220 lbs.	152,000 lbs.	482,399	422,560
Coal	7,229 tons	9,000 tons	98,150	110,000
TOTAL			<u>\$15,302,253</u>	<u>\$13,341,266</u>

*Preliminary Figures

In each Territory \$30,000.00 was spent for Prospectors' Assistance under the Prospectors' Assistance programs. Prospectors participating in these programs during the year totalled 42 in the Yukon and 34 in the Northwest Territories.

Plans for 1966

OIL AND GAS

Interest should continue at a high level in the Peel Plateau area.

Interest should also remain high in the area south of Fort Providence towards the Alberta boundary, and in the Liard Plateau area as well. A total of 20 wells may be drilled in these areas during the year.

The final draft of the Oil and Gas Production Conservation Act has been completed, and it is hoped that it will be introduced in Parliament as soon as may be feasible. If the legislation is enacted, regulations will be prepared.

Schedule of Wells No. 5 will be published. This will contain basic information on all wells drilled to the end of 1965, and geological and engineering data for all wells drilled to the end of 1963. Information brochures and reports on topical items will be prepared during the course of the year.

A seismic program will be carried out on Prince Patrick, Mackenzie-King and Melville Islands by a helicopter-supported geophysical party. This will be the first seismic survey in search of petroleum in the Arctic Islands.

MINING

Because of the increase in mining activity in both Territories, the federal government has approved an increase in its tote road assistance from \$50,000 to \$100,000.00 for each Territory to commence in the 1966-67 fiscal year. The 1965 Tote road assistance fund of \$50,000.00 in the Yukon was exhausted by years end while in the Northwest Territories \$42,000.00 was committed.

The federal government is making further assistance for airport construction to aid resource development on a cost sharing basis as follows:

1. For early exploration aerodromes, 50% of the actual cost with maximum federal assistance not to exceed \$20,000.00 for each aerodrome.

2. For pre-production or early production phase airports, 50% of the actual cost, with a maximum federal assistance not to exceed \$100,000.00 for each airport.

NORTHERN CO-ORDINATION AND RESEARCH CENTRE

Responsibilities To sponsor and conduct research on northern subjects, to encourage northern research by non-governmental agencies, to co-ordinate departmental and interdepartmental research, to collect and disseminate technical and scientific information on the north, and to operate the Inuvik Research Laboratory.

Long-term Plans

To assist in the development of the Canadian north by encouraging an increasing volume of scientific and technical investigations. To provide adequate laboratory and other facilities in the north for the use of scientists from government departments, universities, and elsewhere.

To administer an expanded program of grants to northern research institutes and northern scientific expeditions. To undertake a program of research directed towards northern needs and particularly in the social sciences.

Review of 1965 Operations

Facilities for Scientific Research in the North

The Research Laboratory at Inuvik, including an annex for cosmic-ray measurements, was opened in early 1964 and provides general laboratory and other facilities to support a variety of scientific disciplines. The Laboratory, a two-storey building, contains low-temperature rooms and special arctic experimental facilities in addition to general laboratories, photographic dark room, library, offices, and seminar rooms. The manager and small technical staff provide assistance in support of scientific investigations throughout the year.

Six of the abandoned intermediate DEW Line stations were reserved for use as required for scientific purposes.

Northern Research Program

Fourteen research projects were initiated or continued. Scientists were employed under contract and as seasonal employees from the Universities across Canada. The projects were:

1. A study on the effects of social and economic change in the Eskimo community of George River, P.Q.
2. A study to survey the possibilities of reducing the cost of living in the Mackenzie River Delta through improved technology.
3. A study of the role of sled dogs in the changing economy of the population of the eastern Arctic.
4. A comparative study of the educational arrangements for native peoples in Arctic Canada, Alaska and Greenland.
5. A comparative study of Eskimo administration in northern Canada, Alaska, Greenland and Labrador.
6. A study of northern development with particular reference to the Yukon Territory.
7. A comparative psychological study of two Eskimo groups residing at Baker Lake and in the Ottawa area.
8. A sociological study of the community of Inuvik.
9. A social and economic study of subsistence problems in the Mackenzie River Delta.
10. A research study on Canada's expansion to the north and related problems of sovereignty.
11. A follow-through study of the child-raising customs of the Eskimos living in the Clyde River area.
12. A study of the traditional occupations of people of Indian ancestry living in the Yukon Territory in the context of current conditions.
13. A study of the potential of air cushion vehicles in northern Canada.

14. An anthropological field study concerned with marriage, the family, the role of women and child rearing practices in the Eskimo community of George River.
15. A study of the economic geography of the Mackenzie River Delta.

Grants Program for Northern Research Institutes and Scientific Research Expeditions

During the fourth year of the program of assistance to northern research institutes and northern scientific research expeditions, amounts totalling \$145,000 were awarded, as recommended by the Grants Committee to the Minister. Grants were made to the Arctic Institute of North America, the Arctic Studies Group (L'Universite de Montreal), the Boreal Institute (University of Alberta), the Canadian Research Centre for Anthropology (University of Ottawa), Centre d'Etudes Nordiques (Universite Laval), Committee on Arctic and Alpine Research (University of British Columbia), Committee on Northern Studies (University of Manitoba), Institute for Northern Studies (University of Saskatchewan), Institute of Social and Economic Research (Memorial University), McGill Committee for Northern Research (McGill University), The Institute of Earth Studies (University of Toronto), The Boothia Peninsula Expedition (University of Ottawa), The Devon Island Expedition (Arctic Institute of North America), and the Icefield Ranges Research Project (Arctic Institute of North America).

Reports

Seven reports were issued during the year.

Plans for 1966

The Inuvik Research Laboratory will provide facilities for an increasing number of scientists.

The following projects have been proposed for investigations and will be carried out to the extent that availability of funds and qualified scientific personnel allow:

1. Continuation of the comparative study of Eskimo administration in Alaska, Canada, Labrador and Greenland.

2. Continuation of a study of the role of working dogs in the Northwest Territories.
3. A study of the motivations and perceptions of native people in the rapidly changing socio-economic environment of the Mackenzie Delta.
4. A study of sub-groups among the native people of the Delta.
5. A study of culture-change problems in the Delta as they are perceived by transient white residents.
6. An expanded study to provide additional data and analysis of the resources of the Delta.
7. A study of the mental health of native people living in the Delta.
8. A study to isolate and evaluate the social and physical components significant for regional planning in the Delta.
9. The Centre will participate with the Defence Research Board in the organization and conduct of the Hovercraft Trials in the Mackenzie Delta for the Advisory Committee on Northern Development.

NORTHERN CANADA POWER COMMISSION

Responsibilities To provide electrical power in the Yukon and Northwest Territories as authorized by the Governor-in-Council. To operate each plant from consumer revenue on a self-sustaining basis including repayment of capital expenditures.

Long-term Plans

Forecast and normal planning in order to establish, maintain, and expand electrical and utility requirements.

Northwest Territories

<u>PLANT</u>	<u>UTILITIES</u>	<u>CAPACITY</u>	<u>KWH</u> <u>OUTPUT</u>	<u>STAFF</u>	<u>CONSUMERS</u>	<u>APPROX.</u> <u>GROSS</u> <u>REVENUE</u>
Taltson (Hydro)	Power	25,000 HP	7,030,200*	16	2 (whole-sale)	\$ 81,755*
Fort Smith Distribution System			6,536,539		551 (Retail)	\$ 282,258
Pine Point Distribution System					30 (Retail)	\$ 3,744*
Inuvik (Diesel)	Power	3,500 KW	10,164,700	33	541	\$ 407,433
	Heat	90,000,000 BTU's/hr			54	\$ 451,264
	Water & Sewerage				50	\$ 62,344
Fort McPherson (Diesel) (Operated for NA&NR)	Power	500 KW	1,534,530	15	23	\$ 17,960
Fort Simpson (Diesel)	Power	1075 KW	2,243,580	23	110	\$ 147,017
Aklavik (Diesel) (Operated for NA&NR)	Power	470 KW	509,800	4	59	\$ 16,455.68
Frobisher Bay (Diesel & Gas Turbine)	Power	3500 KW	9,529,457	21	295	\$ 493,205
	Heat	42,000,000 BTU's/hr			2	\$ 46,204

<u>PLANT</u>	<u>UTILITIES</u>	<u>CAPACITY</u>	<u>KWH OUTPUT</u>	<u>STAFF</u>	<u>CONSUMERS</u>	<u>APPROX. GROSS REVENUE</u>
Fort Resolution (Diesel)	Power	325 KW	576,570	3	69	\$ 57,262
Snare River (Snare Rapids) (Snare Falls) (Hydro)	Power	17550 HP	83,993,012	11	5 (whole- sale)	\$ 593,449
<u>Yukon Territory</u>						
Mayo (Hydro)	Power	6000 HP	35,616,100	7	1 (whole- sale) 170 (retail)	\$ 394,662
Whitehorse	Power	15,000 HP	39,218,300	7	5 (whole- sale)	\$ 521,244

* Part year only - Taltson Hydro Commissioned October 29 1965.

The following work was completed during 1965: -

- a) Extension of a heat line from the central heating plant to the Federal Building at Frobisher Bay.
- b) Construction of a composite, office, storage and workshop building at Inuvik.
- c) The commissioning of the 25,000 HP Taltson River Hydro project and associated 170 mile transmission lines to supply Pine Point Mines Ltd. and the Fort Smith area.
- d) Construction of a new power plant building at Fort McPherson.
- e) Construction of single staff quarters at Mayo and Yellowknife.
- f) Commissioning of the remote control centre at Yellowknife and transfer of operating headquarters and staff from Snare River to Yellowknife.
- g) Investigation of power and heat supply for the proposed Baffinland Iron Mines development on Baffin Island.

Plans for 1966

The following work is scheduled: -

- a) General maintenance of transmission lines and plants and extension of distribution systems as required to service new construction.
- b) Investigation of power supply for Coppermine, N.W.T.
- c) Assume control and extend the power plant at Cambridge Bay, N.W.T.
- d) Construction of a new standby Diesel Building at Fort Smith.
- e) Increase the capacity of the domestic water service at Inuvik.
- f) Increase the capacity of the Diesel Electric plant at Inuvik.
- g) Establishment of a diesel generating plant at Dawson, Yukon including reconstruction of distribution system and water supply system.

NORTHERN TRANSPORTATION COMPANY LIMITED

Responsibilities To act as a common carrier of freight in the Western Arctic and in the Mackenzie River system, including Lake Athabasca, Great Slave Lake and Great Bear Lake, under the jurisdiction of the Board of Transport Commissioners.

To distribute freight by sea from Tuktoyaktuk to the DEW Line stations and to other populated areas in the Western Arctic.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

Tonnage handled by the Company on the Mackenzie River system during the 1965 season was 190,630 tons - which was an increase of 49% over 1964. During the year Northern Transportation took over Yellowknife Transportation Company Limited and Arctic Shipping Limited and this large increase in total tonnage handled is reflected in taking over the tonnages previously handled by these two organizations. Of the above total, 42,294 tons moved into Northern Alberta and Saskatchewan from Waterways; 11,730 tons moved from Alberta in to the Northwest Territories, 7,662 tons moved southbound to Waterways; and the balance represented the movements within the Northwest Territories, Alberta and Saskatchewan.

This year, in servicing the Arctic coast, the New Arctic Supply vessel, the "FRANK BRODERICK", arrived in the area at the end of July. This vessel, indicated in our plans for 1964, greatly assisted the operation in the area.

Ice conditions in the Arctic were considerably better than in 1964 and all freight destined to the Arctic areas was delivered.

This year the tonnage delivered to the Colville River, on the north slope of Alaska, was down to approximately 1,500 tons. Some problems were encountered by the oil companies in importing fuel oil from Canada in to the Alaskan area.

Water conditions on the Mackenzie River watershed were, for the most part, good, but some difficulties were encountered in the Sans Sault Rapids late in the season.

Plans for 1966

Capital expenditures are estimated at \$3,200,000. Approximately \$1,750,000 will be spent on upgrading the freight facilities, including a sheet-piling wharf at Tuktoyaktuk with the location being moved to Cache Point which is on the same side of the Bay as the village, the airstrip and the DEW Line site. Approximately \$800,000 will be spent on upgrading the living accommodations at a number of the Company's agencies, together with further improvements to the Hay River terminal facilities. \$165,000 will be spent on jumbo-izing three of the smaller barges, making two large barges which are particularly adapted to handling oil drilling equipment on the Mackenzie River. The balance will, for the most part, be utilized in replacing agency mobile equipment.

POST OFFICE DEPARTMENT

Responsibility Provision of mail service to and from post offices
in the Yukon and Northwest Territories.

Long-term Plans

To provide adequate mail service subject to the availability of
transportation services.

Review of Operations for the Fiscal Year 1964-65

Transportation

The following table lists the scheduled air and surface mail transportation
services on which mail was conveyed to and from the Yukon and
Northwest Territories showing the expenditures for the fiscal year
1964-65.

YUKON

<u>Air Transportation</u>	<u>1964-65</u>
Dawson - Old Crow	\$ 19,780.65
Dawson - Stewart River	3,000.36
Vancouver - Whitehorse	598,724.61
Whitehorse - Dawson	<u>43,213.49</u>
Total	\$664,719.11

Surface Transportation

Atlin - Whitehorse	\$ 6,000.00
Dawson - Granville	1,820.00
Dawson Creek - Whitehorse	70,649.00
Keno Hill - Mayo	4,368.00
Whitehorse - Alaska Highway Mile 1202	8,954.00
Whitehorse - Dawson	15,163.00
Post Office to Airport Services	<u>8,094.98</u>
Total	\$115,048.98
Total expenditure for conveyance of mail to and from the Yukon Territory	<u>\$779,768.09</u>

NORTHWEST TERRITORIES

Air Transportation

1964-65

Edmonton - Mackenzie River Area	\$ 583,771.86
Fort Churchill - Baker Lake	70,334.62
Fort Churchill - Coral Harbour	15,752.88
Inuvik - Sachs Harbour	745.50
Inuvik - Reindeer Station	467.00
Montreal - Resolute	191,529.51
Yellowknife - Discovery	1,546.60
Fort Nelson - Fort Liard	1,216.80
Service to Cape Dorset	20,089.80
Christmas Air Drop (R.C.A.F.)	<u>8,235.23</u>

Total

\$ 893,689.80

Surface Transportation

Hay River - Rae	1,500.00
Peace River - Hay River	44,103.75
Post Office to Airport Services	12,084.74

Total

57,688.49

Total expenditure for conveyance of mail to and
from the Northwest Territories

\$ 951,378.29

As in previous years advantage was taken of the opportunity to despatch mail to settlements in the North on a courtesy basis, by government and privately owned vessels, flights of the R.C.A.F. and R.C.M.P., as well as aircraft chartered by other government departments.

Revenue

During the fiscal year 1964-65 the revenue derived from Post Offices was as follows:

Northwest Territories	\$ 139,774.61
Yukon Territory	<u>159,737.82</u>

Total

\$ 299,512.43

Expenditures for salaries at Post Offices paid from postal revenue were as follows:

Northwest Territories	\$ 62,026.20	
Yukon Territory	<u>53,070.07</u>	
Total		\$ 115,096.27

New Post Offices

In January 1965 a post office was established at Cameron Hills, N.W.T. However it was subsequently found necessary to close it and in view of its very limited usefulness we do not anticipate that it will be re-opened.

Arrangements are now being made for the opening of a post office at Fort Franklin, N.W.T. and attempts to establish an office at Spence Bay, N.W.T. are continuing.

Plans for 1966

To provide adequate postal service, commensurate with cost.

DEPARTMENT OF PUBLIC WORKS

Responsibilities Site investigations, planning and construction of buildings, highways, and bridges for both public use and to meet the requirements of other government departments. Maintenance and improvements to river routes and provision of wharves and harbour facilities as well as river bank protection. The planning and installation of sewer, water, and power services in northern settlements. The provision of architectural and engineering services to all government departments or agencies as required. The acquisition, management, and control of government properties. The construction and management of federal housing in northern settlements. The development planning of townsites when requested by the Department of Northern Affairs and National Resources. Assistance in building research when required.

Long-term Plans

To act as architectural and engineering consultants and construction agent for the government on the effective development of northern Canada. To assist in the planning and construction of properly developed centres from which to administer and develop the North. These centres are Whitehorse, Inuvik, Yellowknife, Fort Smith, Hay River, Frobisher Bay and Churchill. As requested, to develop town plans for a number of settlements in order to properly coordinate the future expansion and development of these communities. To continue to provide engineering services to meet the requirements of the Departments and Government Agencies in the field of site investigation and development planning and installation of sewer and water facilities, plus highway maintenance and construction. To continue to maintain and improve navigable waterways and docking facilities. To establish housing standards for federal employees in northern communities.

Review of 1965 Operations

Planning and construction proceeded satisfactorily, and many interesting projects were commended. Work has commenced on the site at Fort

McPherson School and Gymnasium, the prisons at Yellowknife and Whitehorse, Hay River Federal Building, Fort Franklin and Aklavik Nursing Stations. In the eastern area, schools were started at Pond Inlet and Pangnirtung. The latter has been completed and occupied.

Plans are well advanced for school buildings at Inuvik, Cambridge Bay and Hay River. The school at Pine Point was completed and occupied.

The Department continued the operation and administration of Fort Churchill. Major alteration work was carried out to existing buildings. Buildings were converted to form dormitories, classrooms and single men's quarters. Installation of equipment was also executed at the airport. The non-magnetic building for the Department of Mines and Technical Surveys was completed.

At Inuvik the 14-unit apartment building was completed and a new contract was entered into for a 20-unit apartment. The Town Planner has completed his proposals for the future development of the community.

Units were erected for the R.C.M.P. at Igloolik and Cape Dorset.

Entrepreneurs have continued their interest as previously reported. During the year negotiations were concluded to lease two houses and 23 single units in Hay River, 9 single units in Yellowknife, 7 single units and 40- one bedroom apartments in Pine Point, 20 single family units and 20 one and two bedroom units in Fort Smith. The Department is now responsible for 500 housing units and 170 apartment units in Fort Smith, Hay River, Yellowknife, Pine Point and Fort Simpson.

Maintenance operations were continued during the year on the Northwest Highways System. Pre engineering work was undertaken on some sections of the vast road network under this system.

With the completion of the superstructure of the Hay River Bridge there is now complete highway access between Hay River and Pine Point. Graveling of approximately 54 miles of this all weather highway is continuing and work on this particular phase of construction is scheduled for completion during the 1966 season. A sixty mile contract was awarded covering new construction commencing from the Little Buffalo River westward on the designated Fort Smith Highway.

Two contracts were awarded for work at Hay River townsite covering the construction of the lake intake and pumphouse facilities and water and sewage distribution system. Construction on both programmes will carryover into the 1966 construction season.

A number of engineering projects underway during the year included the following: Inuvik undeveloped area survey; Mackenzie Highway traffic studies; pre-engineering on 50 miles of the unconstructed section of the Fort Smith highway; Survey of Mackenzie Drive at Hay River and the location of proposed highway between Pine Point and Fort Resolution.

Construction of a 75 mile section of road between Watson Lake and Ross River is continuing with approximately 10% of the work remaining to complete the operation. The completion of this project will enable traffic to travel the entire 225 miles between Watson Lake and Ross River. The only other major road project underway, in this area, was a 27 mile grading contract which was completed during the summer. A contract for the construction of a steel pony truss at both the Big Campbell River and Money Creek was awarded late in the season with completion scheduled for the summer of 1966.

Work commenced as planned on the first section of the Ross River Carmacks Road. The 50 Mile grading contract awarded as a two year operation will be continued under next year's work programme.

A number of further engineering projects were underway during the year, a few of which are listed as follows: Continuation of pre-engineering on the Ross River to Carmacks location; Reconnaissance survey on the Carmacks Snag Road; location of Sixty-Mile Road, connecting Clinton Creek access road and a study of gravel requirements between Watson Lake and Ross River.

An intensive dredging programme was carried out during 1965 on the Athabasca River etc. Dredging was also performed on the Mackenzie River at Hay River and various wharves in the area. A new floating wharf was constructed at Aklavik and another started at Moose Factory, also a wharf at Tuktoyaktuk. Major reconstruction of the wharf at Inuvik was started. Wharf repairs and minor improvements were carried out on a number of other sites. River bank protection works were built at Fort George and Moose Factory.

Plans for 1966

It is intended that the school building programme will continue. The school at Pond Inlet will be completed and work will commence on the projects at Hay River, Inuvik and at Cambridge Bay, where hostels for the children will also be built. A gymnasium will be added to the school at Tuktoyaktuk. Drawings will be prepared for a new school at Coppermine and the school building at Fort McPherson should be completed.

Further work will be done for the R.C.M.P. with a possible new building at Fort Smith and other locations.

The prisons at Whitehorse, and Yellowknife, should be completed.

The preparation of Town Plans for other settlements will continue.

The 1965 dredging programme will be continued in 1966. The larger construction projects started in 1965 will be completed. Minor repairs and maintenance will continue.

The Department of Mines and Technical Surveys has requested assistance for surveying and constructing tide gauge stations at Alert Bay, Resolute Bay, Frobisher Bay, Port Harrison, Churchill, Hall Beach, Pond Inlet and Cape Dyer.

Maintenance programme will be continued on the Alaska Highway, Haines Road and connecting roads.

Bridge reconstruction on the Alaska Highway is contemplated at the following locations during the year; Dry Creek, Long's Creek, Edith Creek and Muskwa River.

As a result of engineering studies for water supply and sewage disposal system undertaken in the Whitehorse area provision has been made in this years programme for the construction of an integrated water supply system. It is expected that with an early start on construction work can be completed by the fall of the same year.

Work programme for the Fort Smith Highway will include 50 miles of new construction. In addition the erection of two new structures at Salt River and Little Buffalo River are also planned. This will complete the programme for major construction on this highway.

Construction is to be reactivated along the Ingraham Trail with the following programme tabled for the new year. Widening of four mile section of the presently constructed grade and sixty mile extension programme including provision to erect five structures, two steel pony trusses and three reinforced concrete bridges.

The first contract in an extensive clearing operation to be undertaken on the Mackenzie Highway Extension to Fort Simpson will get underway with additional work planned for subsequent years.

Other projects to be carried out during the year will include the construction of the Salt River Bridge located on the Fort Smith-Peace Point Road.

Included in the planned programme will be pre-engineering projects consisting of location surveys, site investigations etc. on the Mackenzie Highway extension to Fort Simpson, the extension of the Ingraham Trail, further surveys to be undertaken between Pine Point and Fort Resolution.

Proposed work on the Watson Lake-Ross River Road will include rehabilitation of the grade between mile 67 and Ross River. Other major undertaking will include the construction of bridges over the Ketza and Houle Rivers.

Construction is to commence on the Sixty-Mile Road also known as the Boundary Road. Work on this particular project will consist of clearing and grading of 37 miles of development road.

The second 50 mile grading contract is proposed between Ross River and Carmacks plus a contract for the construction of the Lappe River Bridge.

Engineering projects planned will also include location survey of the Dempster Highway between Chapman Lake and Fort McPherson; further engineering is to be carried out on the Carmacks-Snag Road and aerial surveys and mapping are planned, as well as site surveys for a number of proposed bridge locations.

ROYAL CANADIAN MOUNTED POLICE

Responsibilities The Royal Canadian Mounted Police remains the only law enforcement agency in the Yukon Territory and the Northwest Territories and is responsible for the enforcement of Federal Statutes, the Criminal Code and Territorial Ordinances. In addition, the Force is responsible for policing the municipalities of Whitehorse, Dawson, Yellowknife and Hay River, as well as small areas of Northern British Columbia and a northern portion of Wood Buffalo Park in Alberta. The Force also performs a number of varied functions on behalf of other Government Departments and agencies.

Long-term Plans

Since the increased concentration of population in the northern settlements is resulting in more time being spent policing the immediate areas, aircraft is being used more frequently for patrolling the outlying areas. Nevertheless, dog and boat patrols continue to visit all distant settlements when practicable. Continuing increase in the field staff of other Government Departments is gradually relieving the Force of some of the extra duties previously performed.

The location and strength of detachments continue to alter from time to time in order to cope with economic and industrial developments, population shifts, changing patterns of crime and flood and epidemic conditions.

Review of 1965 Operations

<u>MILEAGE</u>	<u>1964</u>	<u>1965</u>
Dog Team.....	35,461	31,743
Boat.....	92,924	119,018
Foot Patrols.....	40,846	41,593
Aircraft, railway, motor-vehicle.	1,568,683	1,718,606
TOTAL.....	1,737,914	1,910,960

<u>INVESTIGATIONS</u>	<u>1964</u>	<u>1965</u>
Offences Investigated.....	8,801	9,081
Other duties.....	31,816	24,371
Total Prosecutions.....	5,505	6,115
Prosecutions (Liquor).....	3,258	3,671
Murders Investigated.....	4	4
Narcotics Investigated.....	1	1

PRISONERS HANDLED

Yukon Sub-Division.....	1,799	1,887
Fort Smith Sub-Division.....	1,498	1,747
Western Arctic Sub-Division.....	583	783
Central Arctic Sub-Division.....	24	16
Eastern Arctic Sub-Division.....	145	163
TOTAL.....	4,049	4,596

In isolated areas members continue to render medical assistance. Everywhere assistance is given to the enforcement of the Dog Ordinance and to the inoculation of all dogs for rabies and in some instances distemper. Patrols are made to Eskimo and Indian camps to enquire into the health and welfare of the people, to look into game matters, and record all information of interest to the Force and other Government Departments. Close touch is kept with all tourists travelling through the North to ensure safe arrival at their destinations. Highways are patrolled and watercraft checked to ensure compliance with safety regulations.

Members are engaged in the Scouting Movement, hockey and baseball activities, youth work and a number of special fields where emphasis is placed on the prevention of crime.

A total of five aircraft was engaged in duties in the Yukon Territory and Northwest Territories; these aircraft were posted at Whitehorse, Inuvik, Fort Smith, Frobisher Bay and Fort Churchill, Manitoba.

The financial agreement for the policing of the Yukon Territory was signed, as was the financial agreement with the Northwest Territories in 1964.

Although a telex system is only utilized at Whitehorse, Fort Smith and Fort Churchill, Manitoba, single sideband radio has been established to connect Inuvik, Whitehorse, Fort Smith, Fort Churchill and Frobisher Bay as well as numerous other detachments.

A new detachment was opened at Cape Dorset, N.W.T.

Plans for 1966

For a good many years the need for Territorial Gaols in the North has been emphasized that it is now expected that construction of such institutions will be completed during 1966, at both Whitehorse and Yellowknife. We are indeed fortunate to have operated our police cells, which were never designed or equipped to fill the capacity of Territorial Gaols, for so many years without any untoward incidents and it will be a relief to have adequate up-to-date gaol facilities.

Although the purchase of land and water transport remains constant, consideration is being given to the construction of additional detachment office space and accommodation for both married and single personnel at the following locations:

Carmacks
Spence Bay
Eskimo Point
Pine Point
Watson Lake

Close liaison with Federal Government Departments and the Territorial Governments will be maintained.

Although "G" Division has a total strength of one hundred and ninety four (194) members, thirteen (13) members are stationed at Division Headquarters in Ottawa and three (3) members at Fort Churchill, Manitoba. The remaining one hundred and seventy eight (178) are located in the North as shown in Appendix "B".

DEPARTMENT OF TRANSPORT (AIR)

AIRPORTS AND FIELD OPERATIONS BRANCH

Responsibilities The operation and maintenance of airports owned by the Department of Transport in the north.

Long-term Plans

To anticipate and satisfy future needs for Airports and Field Operations in the north in conjunction with northern development.

Review of 1965 Operations

Goose Bay, Labrador -

Road paving commenced on the Otter Creek and Happy Valley Roads.

Plans being developed for a new civilian air terminal/Operations building, aircraft apron and taxiway, car park and access road.

Wabush, Labrador -

Paving of runway and installation of runway lighting commenced.

Fort Chimo, Quebec -

It will be necessary to maintain a first class airport but the Quebec Government has asked us to reduce the airport reserve boundaries and this has been attended to. We are waiting for Provincial authorities to comment on our proposed new boundaries.

Schefferville, Quebec -

Former RCAF Station Knob Lake was taken over in part by the DOT on Sept. 1, 1965, for the purpose of continued maintenance and operation of the Schefferville Airport. The Indian Affairs Branch of Department of Immigration took over former RCAF buildings not required by the D.O.T. and at the moment

Plans for 1966 Operations

To be completed in 1966.

Construction to commence in 1966.

To be completed in 1966.

The leading role at Fort Chimo will gravitate from the Department of Transport to other Departments in the near future as other activities increase.

Review of 1965 Operations

the two Departments are endeavouring to decide on land boundaries of the former air station. Canadian Marconi Company are operating and maintaining the airport under contract for us.

Churchill, Manitoba -

Runway 15/33 has been reduced in operational length from 11,000 feet to 8,500 feet due to deteriorating conditions at the north end. This usable portion will be repaved next year and maintained at this new 8,500' length, which is consistent with aircraft type requirements at Churchill.

Fort McMurray, Alberta -

Widen taxiway to 75 feet.

Grande Prairie, Alberta -

Overlay runway and install runway lighting. Work starting in 1965.

Uranium City, Alberta -

Surface treat runway being planned.

Dawson Creek, B.C. -

Paving of runway, taxiway, apron together with runway lighting and extension of the runway by 400 feet commenced.

Fort Nelson, B.C. -

Air Terminal extension to operations building. Drawings completed.

Fort St. John, B.C. -

Sand storage building, maintenance garage and firehall being planned.

Surface treatment of runways and taxiways being planned.

Plans for 1966 Operations

Taxiway lighting will be installed at Churchill to meet the change in runway length.

Planned for 1966.

Work to be completed in 1966/67.

Work to commence in 1966.

To be completed in 1966.

Construction work to be completed in 1966.

Construction to commence in 1966.

Work to start in 1966.

Review of 1965 Operations

Baker Lake, N.W.T. -

The Airports and Field Operations Branch assumed the responsibility for the operation and maintenance of this station in 1965. Four houses were moved to a position on higher ground. This is the first move in the establishment of a new housing area, designed to provide better drainage and clearances from snow-drifting. Application has been made for land reserves encompassing the airfield, transmitter site, remote receiver site and building area.

Cambridge Bay, N.W.T. -

A revised Memorandum of Understanding covering responsibilities at Cambridge Bay was approved by DOT and DNA & NR.

Coral Harbour, N.W.T. -

Permanent staff accommodation has been remodelled and is comparable with the best northern sites. Support was provided during the summer to a party from D.M.T.S., consisting of 18 men with two chartered aircraft, conducting measurement surveys in the area.

Fort Simpson, N.W.T. -

Extension to operations building being planned.

Fort Smith, N.W.T. -

Extension to Air Terminal Building and related works being planned.

Frobisher, N.W.T. -

While still maintaining a first class airport facility at Frobisher, the

Plans for 1966 Operations

Two storage buildings are planned for Baker Lake.

Construction to commence in 1966.

Construction work to commence in 1966.

Some of the DOT activities which we expect may be

Review of 1965 Operations

decrease in aircraft activity and and the increased activity associated with the Department of Northern Affairs and National Resources places the latter Department in the leading role at the site.

The transfer of DOT owned housing units to DNA & NR is presently being negotiated between Departments and the reduction of airport reserve boundaries is well advanced.

Hay River, N.W.T. -

Airport improvements including paving of runways, taxiways and apron being planned.

Norman Wells, N.W.T. -

Storage building.

Two double dwellings construction work commenced. Construction of a power house plant being planned.

Resolute, N.W.T. -

Resolute was licenced as a public airport on January 29/65. It is operated and maintained under a contract with Tower-Foundation Joint Venture. A general overhaul of all buildings, equipment and facilities has been completed. Permanent staff accommodation has been centralized in the North Camp. Daily bus schedules serve the Scientific Agencies in the South Camp. 14,000 cubic yards of runway repair material have been laid. Extra stable granular fill for this purpose was obtained in the vicinity.

Plans for 1966 Operations

transferred to DNA & NR in the near future are:

Road Maintenance
Stores
Single Staff messing
Building Maintenance
Crash/Fire Protection
Vehicle Maintenance

Work to commence in 1966.

To be completed in 1966/67.

Construction work to commence in 1966.

It is proposed that the POL facilities at Resolute will be leased to a commercial oil company in 1966.

Review of 1965 Operations

Wrigley, N.W.T. -

Operations building and waiting room space being planned.
Rehabilitate power plants.

Yellowknife, N.W.T. -

Repair runway and seal coat. Work commenced.
Pave entrance road and car park.
Visual glide slope being planned.

Teslin, Yukon Territory -

Installation of modified runway lighting system being planned.
Maintenance responsibilities for airport transferred from DOT to DPW.

Watson Lake, Yukon Territory -

Maintenance garage being planned.

Whitehorse, Yukon Territory -

Emergency power house and plant being planned.

Plans for 1966 Operations

Construction work to commence in 1966.

Work to commence in 1966.

Work will continue in 1966.

Work will continue in 1966.

Installation to commence in 1966.

Work to commence in 1966.

Construction work to commence in 1966.

Construction work to commence in 1966.

CONSTRUCTION BRANCH

Responsibilities Construction for the Air Services of the Department of Transport.

Long-term Plans

Normal planning to meet responsibilities.

Review of 1965 Operations

The Construction Branch undertook and carried out:

- (a) Airport development and lighting projects:
 - (i) In the Northwest Territories:
Alert, Resolute Bay, Cambridge Bay, Fort Simpson, Fort Smith, Hay River, Yellowknife and Frobisher.
 - (ii) In the Yukon Territory:
Watson Lake and Whitehorse.
 - (iii) In the Provinces:
Churchill, Man., The Pas, Man., Thompson, Man., Fort McMurray, Alta., Dawson Creek, B.C., Fort Nelson, B.C. and Fort St. John, B.C.
- (b) Buildings and other miscellaneous projects:
 - (i) In the Northwest Territories:
Cambridge Bay, Fort Good Hope, Fort Resolution, Clyde River, Frobisher, Nottingham Island, Alert, Arctic Bay, Baker Lake, Chesterfield Inlet, Coral Harbour, Ennadai Lake, Eureka, Mould Bay, Resolute Bay, Coppermine, Fort Simpson, Fort Smith, Norman Wells, Yellowknife and Nottingham Island.
 - (ii) In the Yukon Territory:
Burwash Landing, Watson Lake and Whitehorse.

(iii) In the Provinces:

Fort Chimo, P.Q., Moosonee, Ont., Nitchequon, P.Q.,
Port Harrison, P.Q., Churchill, Man., The Pas, Man.,
Thompson, Man., Trout Lake, Ont., Fort Chipewyan, Alta.,
Fort McMurray, Alta., Fort Nelson, B.C., Fort St. John,
B.C., Smith River, B., Sikanni Chief, B.C., Hudson Bay,
Sask. and Lansdowne House, Ont.

Plans for 1966

The Construction Branch will complete or continue work in progress, or begin new work as follows:

(a) Airport development and lighting:

(i) In the Northwest Territories:

Cambridge Bay, Fort McMurray, Fort Nelson, Hay River,
Uranium City, Yellowknife and Resolute Bay.

(ii) In the Yukon Territory:

Teslin and Whitehorse.

(iii) In the Provinces:

Churchill, Man., Thompson, Man., Dawson Creek, B.C.,
Fort St. John, B.C., and Peace River, Man.

(b) Buildings and other miscellaneous projects:

(i) In the Northwest Territories:

Clyde River, Frobisher, Baker Lake, Chesterfield Inlet,
Coral Harbour, Resolute Bay, Coppermine, Fort Good
Hope, Fort McMurray, Fort Nelson, Fort Resolution,
Fort Simpson, Fort Smith, Norman Wells, Sachs Harbour,
Wrigley and Yellowknife.

(ii) In the Yukon Territory:

Burwash Landing, Mayo, Teslin, Watson Lake and Whitehorse.

(iii) In the Provinces:

Capes Hopes Advance, P.Q., Deception Bay, P.Q., Fort Chimo, P.Q., Nitchequon, P.Q., Great Whale River, P.Q., Moosonee, Ont., Port Harrison, P.Q., Churchill, Man., Thompson, Man., Trout Lake, Ont., Dawson Creek, B.C. and Fort St. John, B.C.

METEOROLOGICAL BRANCH

Responsibilities Provision of adequate meteorological facilities and services to meet requirements; research necessary to support these services and to increase understanding of the weather and climate of northern Canada, both near the surface and in the upper air observing stations, obtaining of meteorological reports from ships in northern waters, ice reconnaissance, the provision of weather forecasting and weather advisory service, and ice forecasting and ice advisory service for the navigable waters of the north. Operation of thirteen upper air stations in the north and jointly with the United States Weather Bureau, operation of the arctic meteorological observatories at Resolute, Alert, Eureka, Isachsen, and Mould Bay, including maintenance and development of the supporting airstrips at the last four of these stations, and operation of telecommunications facilities at these four stations in support of the meteorological program.

Long-term Plans

To provide more complete meteorological and related scientific information in the north, necessitating an expanded network of surface weather observing stations and improved equipment for upper air observations to higher levels; to provide forecasting services as needed for expanding activities in the north; to provide more married living accommodations at several locations in order to encourage more experienced personnel to serve at these stations; to operate seismic vaults for the Department of Mines and Technical Surveys at a few locations, and to undertake a program of ozone, water vapour, and radiation observations to high levels in the atmosphere at certain stations.

Review of 1965 Operations

The synoptic and aviation weather reporting network north of 60°N was reduced to 55 stations with the closing of Snare Rapids, N.W.T. The meteorological programme at the DEW Line sites remained unchanged,

and each site was visited at least twice during the year by the DEW Line Meteorological Inspectors. The radio-active fall-out sampling was continued at 6 meteorological stations, and the visual aurora programme at 22 meteorological stations. The noctilucent cloud observing network was increased to 17 stations and the number of stations completing snow surveys was increased by four to a total of 17. Approximately 85% of the surface observing network were visited by the Meteorological Inspectors.

All the upper air stations maintained their full programme of two rawinsonde ascents per day sending instruments aloft to heights averaging over 80,000 ft. to measure and transmit temperature, pressure, and relative humidity data throughout the ascents. These instruments were also tracked in the course of their ascent to determine the upper winds at the various levels. Significant progress has been made in the effort to achieve higher levels in upper air and upper wind observations.

New rawinsonde ground equipment was installed at Baker Lake, Coral Harbour, Frobisher, Hall Beach, Norman Wells and Whitehorse. This equipment is capable of tracking the radiosonde airborne instrument up to heights of 100,000 feet for purposes of measuring the upper winds to these high altitudes. This new electronic balloon tracking ground equipment which is to be installed at all the upper air stations requires a good natural horizon which is free from obstructions down to at least 4° elevation. Several of the stations do not meet these requirements.

Preliminary surveys and planning have been undertaken to relocate the upper air stations at Clyde, Frobisher, Inuvik and Coppermine in order to provide a better horizon for the GMD rawinsonde ground equipment. In addition to regular upper air observations the personnel at Coppermine and Frobisher are carrying out a program of seismological observations for the Department of Mines and Technical Surveys.

The Arctic Forecast Team, a component of the Weather Office in Edmonton, continued to provide routine and special forecasts for various activities in the Arctic. Specialized services were also provided for the Yukon, Baffin Island and the southern part of the Northwest Territories by Weather Offices at Whitehorse, Goose Bay, Frobisher and Winnipeg.

The High Level Forecast Centre in Montreal routinely issued forecasts for high altitude aviation for areas extending from the Canada-U.S. border to the North Pole and distribution of these forecasts was made throughout Canada and internationally by facsimile.

The Ice Forecast Central in Halifax issued seasonal ice outlooks, thirty day ice forecasts and five day ice forecasts for Arctic and sub-Arctic Waters. A Field Ice Forecast Office was operated at Frobisher from mid-July to early October to provide short-range ice forecasts and ice advisories for the Hudson Bay shipping route and for Foxe Basin and the Eastern Arctic. A Field Ice Forecast Office operated at Cambridge Bay from mid-July to early August and at Resolute from early August to early September to provide short-range ice forecasts and advisories for coastal waters of the Western and Central Arctic.

A special unit at Frobisher examined and evaluated the usefulness of weather satellite photography in the display of weather and ice conditions in Arctic areas.

The ice observing program in the Arctic was carried out by trained ice observers on chartered aircraft and on Canadian Coast Guard Ships and by weather observers at shore stations, who provided visual ice observations and also measured ice thickness.

The aerial ice observations were in two main parts. A series of three "Round Robin" ice reconnaissance flights were carried out over most of the Arctic in April, May and June. Using DC-4 aircraft 151 hours of aerial ice reconnaissance provided information essential for a seasonal outlook of ice conditions during the navigation season.

The largest operation was in the period from June 22 to November 19 when three DC-3 aircraft and one C-46 aircraft provided platform for ice observers to carry out 1550 hours of ice reconnaissance. Field ice reconnaissance units operated from temporary bases at Churchill, Manitoba, Frobisher Bay, N.W.T., Resolute, N.W.T., and Cambridge Bay/Cape Parry, N.W.T. The areas covered included the shipping route to Churchill, Hudson Bay, Foxe Basin, Hudson Strait, Davis Strait, Baffin Bay, Milne Inlet, Nares Strait, Parry Channel, the shipping route to Eureka and the mainland coast from Spence Bay to Point Barrow as well as the approaches to these areas. All aircraft used in this operation were equipped with radar to provide ice information during periods of low cloud and reduced visibility. The two aircraft providing the major portion of the coverage, especially in areas such as the Queen Elizabeth Islands and large water areas such as Baffin Bay and Hudson Bay were equipped with Doppler Radar, precision gyro compass and astro compasses, and other equipment to ensure the precise navigation required.

A smaller aerial ice reconnaissance operation was carried out over Great Slave Lake, Lake Athabasca and the Slave River in May and June. A chartered Beechcraft was used to provide 74 hours of ice reconnaissance.

Ice Observers also provided ice observation from seven coast guard icebreakers in the Eastern and Western Arctic.

Thirty-seven meteorological stations on Arctic coasts provided shore station ice reports as required and twenty-seven stations provided weekly measurements of ice thickness from freeze-up to break-up.

At the Joint Arctic Weather Stations the meteorological program consisted of eight regular surface synoptic observations and two upper air (rawinsonde) observations daily. Systematic observations were made of sea ice thickness, wind chill, solar radiation, and aurora at all stations. Other observations included hourly surface weather, soil temperature ozone, rates of evaporation and fall-out at Resolute, noctilucent clouds at Alert, Eureka and Resolute, wind chill at Alert, Isachsen and Resolute and profile of sea ice temperatures at Mould Bay. Observations of snow surface and profile were discontinued at all stations in June 1965. In October the meteorological staff at Alert took over the routine maintenance of the neutron monitor for Atomic Energy of Canada.

A significant development in the generation of hydrogen was introduced with the installation of electrolytic generators at Resolute, Eureka, Isachsen and Mould Bay in the latter part of 1965.

The strontium 90 powered automatic weather station located at Sherwood Head, Axel Heiberg Island, was deactivated in April 1965, and removed by icebreaker in August 1965.

In 1965, airstrips at Alert, Eureka, Isachsen and Mould Bay remained in excellent condition throughout the entire summer. Additional gravel was put on the Eureka and Isachsen airstrips in a continued effort to ensure that airstrips may be used by all types of aircraft throughout wet periods in the summer. The Alert airstrip was kept open throughout the winter months.

With the accumulation of fill, the airstrips at Eureka and Isachsen and to a lesser extent that at Mould Bay tend to blow clear of snow.

Airstrips at Alert, Eureka, and Mould Bay are now 200 ft. wide and over 5,000 ft. long. The Isachsen strip is now 4,400 ft. long.

Improvements were made to the fresh water storage and sanitary facilities at Mould Bay, and to the radio communications at all stations. Bulk fuel oil capacity at Alert was increased by 37,500 imperial gallons with the installation of three new tanks.

The rawinsonde site at Mould Bay was moved at a nearby hill to avoid obstacles that limited the effectiveness of the upper air equipment in the former location.

Plans for 1966

With the increasing use of complex avionic equipment for ice observing it is no longer economical to continue the short term charter of aircraft. In addition the increasing length of ice flights is introducing a hazard when small aircraft such as the DC-3 are used over extensive water areas. Negotiations are now underway for the charter, for a five year period, of two DC-4 aircraft which will permit greatly increased safety of operation and which will also permit the effective use of the most precise navigation equipment available. Studies are continuing on improvements to the airborne radar to provide ice information below a cloud cover and on the development of a remote method for the measurement of ice thickness.

The project of reinstrumentation with new GMD ground equipment will be pursued in 1966 and it is expected that the installations will be completed at Sachs Harbour, Inuvik and Fort Smith. Plans for the resiting of Clyde and Coppermine are underway although it is not expected that this project will be completed in the next year. The newly developed electrolytic hydrogen generators will be installed at several of the upper air stations. They will replace the chemical generators now in use and will utilize electrical power and pure water to produce the hydrogen which is necessary to inflate the large aerological balloons used in the upper air observations.

Development and extension of the airstrip at Isachsen to the dimensions 175 ft. x 5,000 ft. will be continued. Fill will be added at Mould Bay to minimize the problems of snow drifting and snow removal. An electrolytic hydrogen generator will be installed at Alert.

As a result of the evaluation of the weather satellite picture relays in 1965, research and development will be carried out with the view of developing procedures for use of this equipment as an operational weather and ice observing medium.

TELECOMMUNICATIONS AND ELECTRONICS BRANCH

Responsibilities To provide radio aids to air and marine navigation; to provide radio facilities for various scientific organizations and for meteorological observations; to provide other telecommunications facilities as required; to foster and promote the development of public telecommunications services; to control and manage the use of the frequency spectrum; to license stations and enforce the regulations under the Radio Act.

Long-Term Plans

To expand operations as the need arises.

Review of 1965 Operations

Baker Lake N. W. T.

A low frequency circuit to Churchill was completed.

Burwash Landing N. W. T.

A contract was awarded for the construction of an aeradio station, a radio range, and five dwelling units for completion in 1966.

Cambridge Bay N. W. T.

Responsibility for the handling of commercial outstation message traffic was transferred to Canadian National Telecommunications.

Coral Harbour N. W. T.

A new non-directional beacon was installed.

Coppermine N. W. T.

A major project was undertaken for the improvement of water supply and sanitation services. A storage warehouse was constructed.

Ennadai Lake N. W. T.

Improvements were made in point-to-point radiocommunications, with the commissioning of single sideband radiotelephony frequencies. New non-directional radiobeacon equipment was installed.

Fort Good Hope N. W. T.

Development work included construction of a transmitter building, provision of cold storage facilities, fuel tanks, refurbishing of the power distribution system and replacement of power plants. A new non-directional radiobeacon was installed and is operating on test.

Frobisher Bay N. W. T.

A permanent instrument landing system was completed.

Nottingham Island N. W. T.

Major renovations were made to station buildings.

Resolute Bay N. W. T.

Voice communications were installed on the high power radiobeacon and scheduled weather broadcasts commenced on this facility.

Watson Lake Y. T.

A landing approach non-directional beacon was established.

Whitehorse Y. T.

A new instrument landing system was commissioned.

Wrigley N. W. T.

Additional air-ground V. H. F. communications facilities were provided.

Yellowknife N. W. T.

A low frequency radio range was commissioned.

Development of Public Telecommunications Services

Canadian National Telecommunications continued construction of the 1000-mile Mackenzie Valley system that was brought into operation for telephone, telegraph and private wire service as far north as Norman Wells in mid-May, with expected completion to its northern terminal at Inuvik by the end of May 1966.

VHF radiotelephone service along the Alaska Highway in the Yukon was expanded by the opening of base stations at Rancheria, McNaughton and Teslin.

CNT in collaboration with DOT arranged a reciprocal plan enabling the use of Dewline facilities between Tuktoyaktuk and Lady Franklin Point for the support of the Mackenzie system and commercial circuits in the in the Lady Franklin-Hay River system.

A small telephone exchange was installed at Tuktoyaktuk. The exchange at Inuvik was moved to a new location and its capacity doubled. Party line service was established at Wrigley.

The Bell Telephone Company, in collaboration with the Department of Transport opened commercial telephone exchanges and private line voice service in the Keewatin District N.W.T. at Eskimo Point, Rankin Inlet, Baker Lake, Coral Harbour and Chesterfield Inlet. A toll station was also opened at Whale Cove in this area.

A small exchange was established by the Bell Telephone Company at Pond Inlet, Baffin Island N.W.T. and a toll station installed at Arctic Bay, Baffin Island.

General

All marine radiobeacons on the Labrador Coast and in Hudson Bay and Strait, which had been operating as transponders, were changed to the periodically operating type, at the beginning of the 1965 navigation season. In addition to providing more stable operation, this new system eliminates the necessity for ships to transmit a triggering signal to turn the beacon on.

New marine radiobeacon installations of the periodically operating type were established at Ashe Inlet NWT, Swaffield Harbour NWT; and Cape Makkovik Lab. These installations will provide additional navigational assistance to vessels enroute to Churchill or taking part in the Arctic sealift.

Non-directional aeronautical beacons for Northern Affairs re-supply were established at Arctic Bay, Grise Fiord, Pangnirtung, Payne Bay and Pond Inlet.

New single sideband point-to-point equipment was installed at Alert, Eureka, Isachsen and Mould Bay in support of joint arctic weather stations.

The air-operational teleprinter network was extended via leased landline facilities, Mackenzie Valley route, from Fort Simpson to Wrigley and Norman Wells.

There are in excess of 1,100 radio stations operated by government departments and agencies in Northern Canada. Of this number, approximately 70 were established during 1965. There are more than 1600 stations in use by private companies operating in the same area of which approximately 370 were established during 1965. These figures include all radio stations in the area north of 55° Lat. N.

Plans for 1966

Chesterfield Inlet N.W.T.

A new dwelling is to be erected. The Chesterfield Inlet - Coral Harbour circuit will be converted to single sideband.

Coral Harbour N.W.T.

New communications control equipment will be installed.

Coppermine N.W.T.

A new transmitter building is to be constructed. New power plants and refurbishment of the power distribution is to be undertaken in conjunction with NANR.

Fort Good Hope N.W.T.

Two dwelling units are to be constructed and a new sewage system installed.

Fort Resolution N.W.T.

Two dwelling units are to be constructed. The radio operations now located in an ex-RCCS dwelling in the settlement is to be relocated to the airport.

Frobisher, N.W.T.

Simultaneous broadcasts of weather information and notices to shipping are planned with the beginning of the 1966 navigation season on 430, 4365.5 and 6493 kc/s. This service will provide more effective coverage of the Eastern Arctic area.

Mayo Y.T.

A new transmitter building and a new garage are to be constructed.

Norman Wells N.W.T.

A new transmitter building is to be constructed.

Teslin Y.T.

A radio control building is to be constructed to replace the existing accommodation in an old converted RCAF barracks.

General

The aeradio operations at Wrigley and Whitehorse are to be relocated to new terminal operations buildings at these sites.

Public Telecommunications Plans for 1966

Canadian National Telecommunications in collaboration with the Department of Transport have firm plans to establish single sideband base stations early in the year at Cambridge Bay and Inuvik and related out-stations at Spence Bay, Gjoa Haven, Bathurst Inlet, Pelly Bay, Thom Bay, Holman Island, and Sachs Harbour situated on various islands well north of the Arctic Circle. These plans also include establishment of out-stations in the District of Mackenzie at Snowdrift, Rocher River, Contwoyto, Lac la Martre, Fort Leard and Nahanni to be served from their existing radio station at Hay River, N.W.T. It is also expected that Old Crow in the Yukon will be served from Inuvik early in 1966.

Additionally Canadian National plans include the establishment of a VHF radio link between Norman Wells and Fort Franklin, a single sideband radio station at Norman Wells to serve exploration parties, and VHF radio telephone stations at Norman Wells and Fort Simpson. A VHF radio system from Inuvik to Tuktoyaktuk via Reindeer Depot and a radio link between Lady Franklin Point and Coppermine with a small exchange at the latter are also planned for 1966.

VHF radiotelephone service to suit special requirements of the RCMP along the Alaska Highway and the Whitehorse - Dawson City Highway as well as public, Federal Department and Yukon Government needs along the latter is under active planning by CNT. A VHF mobile service station at Canyon Mountain Y. T. is expected to be completed by mid-January.

Exchanges at Fort Good Hope, Fort Providence and Fort Norman are due for completion in April, June and July respectively.

General

The foregoing expansion that has taken place as well as that which is planned indicates a substantial forward stride in the provision of commercial telecommunications services in the North as result of the promotional activities of the Telecommunications and Electronics Branch.

DEPARTMENT OF TRANSPORT (MARINE)

MARINE OPERATIONS BRANCH

Responsibilities Providing transportation facilities and co-ordination of cargo and passenger requirements for Government agencies and commercial enterprises; servicing aids to navigation in the Hudson's Bay and Strait and Goose Bay; ice probes conducted in the Milne Inlet area; arranging and providing for stevedoring at the Port of Goose Bay, Labrador, where over 30,000 short tons of cargo were handled.

Long-term Plans

Continuing to improve marine work in the North; planning to meet anticipated additional resupply requirements.

Review of 1965 Operations

A shipment was again delivered to Thule, Greenland for the Canadian Armed Forces, Department of Transport and other agencies for transshipment by airlift to Alert. The weather stations at Resolute Bay, Eureka, and Sherwood Head were supplied by two icebreakers, the CCGS "d'Iberville" and the CCGS "John A. Macdonald" and two chartered vessels. Supplies for Mould Bay and Isachsen were delivered to Resolute Bay for ultimate airlift. Direction finding stations were calibrated. The CCGS "Labrador" assisted in oceanographic surveys of Baffin Bay, Davis Strait, and the Labrador Sea. Commercial shipping requiring icebreaker assistance to and from Churchill was assisted by the ships of the fleet. Lighthouse and navigational aids were examined and serviced in Hudson's Bay and Strait. On completing the resupply duties, the CCGS "John A. Macdonald" and CCGS "d'Iberville" carried out ice surveys and hydrographic work in the area of Milne Inlet and Eclipse Sound.

To carry out the resupply work in the Eastern Arctic in 1965 required the employment of the following: 13 Coast Guard Vessels; 6 chartered vessels and 10 commercial vessels. The total tonnages by vessels is attached and totaled 106,000 net tons transported and/or handled during the season.

CARGO TRANSPORTED BY
CCGS VESSELS - 1965

<u>VESSEL</u>	<u>VOYAGE</u>	<u>CARGO IN LBS</u>
CCGS "AUK"	Montreal - Pond Inlet	137,566
	Montreal - Pangnirtung	12,000
	Montreal - Igloolik	9,000
CCGS "AUK" Voy. 1	Eskimo Point - Churchill	1,020
CCGS "AUK" Voy. 1	Igloolik - Montreal	2,994
	Pond Inlet - Igloolik	9,000
	Alberton, PEI - Montreal	44,000
	Hall Beach - Fox-1 - Rowley	117,449
	Hall Beach - Fox-2 - Long-staff Bluff	6,000
	Hall Beach - Igloolik	4,413
	Hall Beach - Fox-1	104,000
	Rowley Island - Hall Beach	54,000
	Rowley Island - Hall Beach	126,000
	Hall Beach - Igloolik	170,000
	Bray Island - Igloolik	8,000
	Hall Beach - Igloolik	226,000
	Igloolik - Churchill	2,994
	Churchill - Halifax	108,000
	Churchill - Pelly Bay	19,300
	Tanker - Fox-1 & Fox-2	<u>3,134,000</u>
		4,295,736
CCGS "CAMSELL"	Victoria - Cambridge Bay	14,600
	Cambridge Bay - Victoria	<u>9,500</u>
		24,100
CCGS "C.D. HOWE"	Montreal - Arctic Bay	204,529
	Montreal - Grise Fiord	681,619
	Montreal - Koartak	1,482
	Montreal - Sugluk	2,660
	Montreal - Clyde River	10,640
	Montreal - Pond Inlet	520
	Montreal - Great Whale River	65
	Montreal - Cape Dorset	10

Montreal - Pangnirtung	1,705
Montreal - Inugsuin Fiord	49,595
Montreal - Resolute Bay	395
Montreal - Wakeham Bay	1,042
Eastern Arctic Patrol	55,050
Montreal - Port Burwell	2,520
Montreal - Ivugivik	1,121
Montreal - Lake Harbour	232
- Ship's Stores	22,000
- Lateral Cargo	131,523
Various - Quebec	<u>199,093</u>

1,365,801

CCGS "d'IBERVILLE"

Montreal - Pond Inlet	209,087
Montreal - Alert via	
Resolute Bay	4,437
Montreal - Eureka	4,368
Montreal - Resolute Bay	38,514
Montreal - Milne Inlet	87,670
Montreal - Isachsen	4,376
Montreal - Mould Bay	4,213
Montreal - Pangnirtung	3,312
Montreal - Strathcona Sound	101,990
Montreal - Arctic Bay	19,315
Various - Quebec	5,390
- Lateral Movements	<u>158,941</u>

641,613

CCGS "EIDER"

Montreal - Various	52,760
Various - Quebec	84,000
Churchill - Eskimo Point	688,720
Churchill - Coral Harbour	991,581
Coral Harbour - Churchill	6,032
Churchill - Rankin Inlet	2,042,242
Churchill - Pangnirtung	995,397
Churchill - Fort Chimo	14,485
Fort Chimo Oil Shuttle	2,624,098
Goose Bay - Saglek	800,000
Goose Bay - Cartwright	<u>6,600</u>

8,305,915

CCGS "GANNET"	Montreal - Dew Line Sites	643,120	
	Churchill - Various	4,445	
	Hall Beach - Igloolik	560,000	
	Igloolik - Halifax	132,000	
	Churchill - Halifax	108,000	
	Res-X-1 - Dye Main	16,400	
	Pond Inlet - Igloolik	<u>9,000</u>	
			1,472,965
CCGS "JOHN A. MACDONALD"	Montreal - Various	811,784	
	Montreal - Eureka	530,000	
	Sherwood Head - Eureka	20,220	
	Hall Beach - Churchill	2,000	
	Eureka - Tanquary Fiord	47,730	
	Cross Bay - Resolute Bay	90	
	Cape Sparbo - Resolute Bay	200	
	Sherwood Head - Resolute Bay	11,900	
	Tanquary Fiord - Resolute Bay	1,000	
	Thule - Various	<u>106,760</u>	
			1,531,684
CCGS "MONTCALM"	Montreal - Ivugivik	426,515	
	Repulse Bay - Churchill	2,002	
	Churchill - Quebec	11,183	
	Churchill - Various	449,843	
	Rex-X-1 - Dye Main	8,200	
	Brevoort - Churchill	16,800	
	Foxe Main - Fox-2	<u>8,000</u>	
			922,543
CCGS "NARWHAL"	Halifax - Cape Christian	8,400	8,400
CCGS "N. B. MCLEAN"	Montreal - Various	744,688	
	Churchill - Various	572,836	
	Lake Harbour - Churchill	10,940	
	Resolute Bay - Churchill	265	
	Repulse Bay - Churchill	3,845	
	Various - Quebec	<u>18,900</u>	
			1,351,474

CCGS "PUFFIN"

Montreal - Great Whale River	270,552
Montreal - Belcher Islands	4,423
Churchill - Fort George	937,500
Churchill - Baker Lake	980,462
Baker Lake - Churchill	29,050
Churchill - Baker Lake	1,082,132
Churchill - Rankin Inlet	1,277,027
Churchill - Cape Dorset	45,176
Cape Dorset - Deception Bay	60,000
Baker Lake - Quebec	67,110
Montreal - Quebec	10,000
Great Whale River - Churchill	160,000
Bear Island - Great Whale River	3,000
Cape Jones - Fort Chimo	157,625
Great Whale River - Quebec	60,000
Montreal - Cartwright	149,546
Montreal - Battle Harbour	534,092
Cape Dorset - Quebec	13,933
Great Whale River - Cape Jones	<u>550</u>

5,842,178

CCGS "RAVEN"

Montreal - Ivugivik	2,038
Montreal - Belcher Islands	116,500
Montreal - Churchill	9,378
Montreal - Great Whale River	208,173
Churchill - Belcher Islands	5,540
Churchill - Rankin Inlet	3,026,912
Rankin Inlet - Churchill	985
Churchill - Port Harrison	1,035
Churchill - Coral Harbour	7,749
Churchill - Cape Dorset	24,992
Churchill - Sugluk	399,271
Coral Harbour - Churchill	109
Coral Harbour - Nottingham Island	4,129
Churchill - Great Whale River	<u>877,697</u>

4,684,508

CCGS "SIR HUMPHREY GILBERT"	Halifax - Various	817,961	
	Various - Churchill	20,340	
	Churchill - Various	43,850	
	Churchill - Coral Harbour	37,931	
	Churchill - Cape Dorset	<u>219,863</u>	
			1,139,945
CCGS "SKUA"	Quebec - Goose Bay	64,000	
	Rimouski - Cape Hopes	6,000	
	Quebec - Cape Hopes	18,000	
	Goose Bay - Hopedale	6,000	
	Churchill - Chesterfield Inlet	1,263,106	
	Churchill - Whale Cove	961,388	
	Churchill - Igloolik	952,527	
	Churchill - Hall Beach	2,182	
	Churchill - Pelly Bay	25,985	
	Churchill - Rankin Inlet	55,442	
	Churchill - Eskimo Point	3,679	
	Churchill - Cape Dorset	5,175	
	Whale Cove - Churchill	35,690	
	Chesterfield Inlet - Churchill	28,588	
	Fox Main - Longstaff Bluff	50,800	
	Fox Main - Longstaff Bluff	3,800	
	Goose Bay - Saglek Voy. 1	926,000	
	Goose Bay - Saglek Voy. 11	821,200	
	Tanker - Fox-1 & Fox-2	<u>3,134,000</u>	
			8,363,562
Total Tonnage Carried			39,950,424
in CCG Ships		OR	<u>19,975.2 s/tons</u>

CARGO TRANSPORTED BY GOVERNMENT
CHARTERED VESSELS

M.V. "SEA TRANSPORT"	Goose Bay - St. Anthony	2,533,800
	Goose Bay - Cartwright	3,023,200
	Goose Bay - Hopedale	2,393,000

Goose Bay - Saglek	3,795,800
Goose Bay - Saglek	254,400
Goose Bay - Resolution Island	<u>3,798,200</u>

15,798,400

M.V. "J. EDOUARD
SIMARD"

Montreal - Resolute Bay	10,800,000
Goose Bay - Baffin Sites	565,400
Goose Bay - Foxe Basin	11,426,000
Goose Bay - Baffin Sites	<u>33,120</u>

22,824,520

M.V. "JOS. SIMARD"

Montreal - Pond Inlet	1,024,000
Goose Bay - Baffin Sites	13,342,000
Goose Bay - Foxe Basin	<u>10,804,000</u>

25,170,000

S.S. "FEDERAL
PIONEER"

Montreal - Res-x-1	30,800
Montreal - Dye Main	1,154,200
Montreal - Fox-5	160,400
Montreal - Fox-4	71,400
Montreal - Dope-2	238,800
Dye Main - Fox-4	10,800
Fox-5 - Dye Main	43,200
Fox-4 - Dye Main	32,200
Fox-4 - Fox-M	5,800
Dye Main - Res-X-1	5,600
Dye Main - Montreal	48,400
Fox-4 - Montreal	10,600
Fox-5 - Montreal	7,200
Res-X-1 - Montreal	4,600
Montreal - Pangnirtung	1,399,800
Montreal - Broughton Is.	578,200
Montreal - Cape Christian	91,000
Montreal - Clyde River	1,079,000
Montreal - Baffin Sites	148,000
Clyde River - Montreal	38,000
Broughton Island - Montreal	211,600
Pangnirtung - Montreal	21,400
Cape Hooper - Montreal	169,800
Cape Dyer - Montreal	<u>1,296,600</u>

Brevoort - Montreal	187,000
Montreal - Foxe Main	1,182,000
Montreal - Fox-3	146,800
Montreal - Cam-4	95,400
Montreal - Cam-5	103,800
Foxe Main - Montreal	42,800
Fox-1 - Montreal	6,400
Fox-2 - Montreal	13,200
Montreal - Foxe Main	746,000
Montreal - Igloolik	1,046,600
Montreal - Rowley Island	55,400
Montreal - Longstaff Bluff	175,000
Montreal - Repulse Bay	117,000
Foxe Main - Montreal	1,425,400
Rowley Island - Montreal	150,000
Longstaff Bluff - Montreal	242,000
Various Cargo Transfers	<u>2,800,000</u>

15,392,200

S.S. "HAWK"

Montreal - Resolute Bay	6,203,600
Resolute Bay - Montreal	800,000
Quebec - Resolute Bay	<u>123,600</u>

7,127,200

M.V. "SIR JOHN
CROSBIE"

Montreal - Thule	1,052,444
Montreal - Frobisher Bay	2,252,578
Frobisher Bay - Montreal	491,633
Goose Bay - Gap Sites	2,360,000
Wayports	122,000
Goose Bay - Montreal	562,000
Gap Sites - Montreal	<u>60,000</u>

6,900,655

Total Tonnage Carried on
Chartered Vessels

93,212,975
OR 46,606.5 s/tons

CARGO SHIPPED RATE-PER-TON
BASIS - COMMERCIAL VESSELS

M.V. "HIGHLINER"	Montreal - Various	2,268,806	
	Various - Montreal	<u>153,367</u>	
			2,422,173
M.V. "MARIDAN C"	Various - Montreal	143,060	
	Montreal - Wakeham Bay	550,531	
	Montreal - Sugluk	261,824	
	Montreal - Koartak	<u>303,863</u>	
			1,259,278
M.V. "P.M. CROSBIE"	Montreal - Port Burwell)		
	Montreal - Payne Bay)	3,120,745	
	Montreal - George River)		
	Montreal - Povungnituk)		
	Montreal - Port		
	Harrison)	2,196,554	
	Various - Montreal	<u>138,388</u>	
			5,455,687
S.S. "SILLERY"	Montreal - Fort Chimo	616,569	
	Various - Montreal	42,940	
	Montreal - Port Harrison	20,437	
	Fort Chimo - Montreal	23,430	
	Montreal - Great Whale		
	River & Sugluk	<u>41,288</u>	
			744,664
"CHURCHILL RIVER"	Moosonee - Various	265,641	
"RUPERT RIVER"	Moosonee - Various	123,108	
"PIERRE RADISSON"	Montreal - Various	373,261	
"FORT SEVERN"	Montreal - Various	<u>17,967</u>	
			779,977

"IMPERIAL QUEBEC"	Montreal - Frobisher Bay	8,114,400	
M.V. "WHITE ROSE"	Montreal - Frobisher Bay	<u>1,644,000</u>	
			9,758,400
M.V. "CACOUNA"	Montreal - Baker Lake	976,911	
	Churchill - Montreal	8,160	
	Frobisher Bay - Montreal	91,775	
	Montreal - Frobisher Bay	<u>1,334,040</u>	
			2,410,886
"CARIBOU REEFER"	Montreal - Frobisher Bay	<u>38,199</u>	
	Total Tonnage Carried		22,869,264
	On a Rate-per-ton Basis	<u>OR</u>	<u>11,434.6 s/tons</u>

WESTERN ARCTIC TONNAGES:

Waterways - Various	442,400	
Norman Wells - Various	4,022,000	
Hay River - Various	2,136,600	
Fort Smith - Various	18,200	
Inuvik - Various	<u>436,200</u>	
	OR	7,055,400
	<u>OR</u>	<u>3,527.7 s/tons</u>

GOOSE BAY CARGO:

U.S.A.F.	48,422,040	
R.C.A.F.	3,080,878	
D.O.T.	1,562,400	
COMMERCIAL	<u>8,207,432</u>	
		61,272,750
	<u>OR</u>	<u>30,636.4 s/tons</u>

RECAPITULATION

	<u>CARGO IN LBS.</u>
Canadian Coast Guard Ships	39,950,424
Chartered Vessels	93,212,975
Rate-per-ton - Commercial vessels including bulk oil to Frobisher Bay.	22,869,264
Western Arctic	7,055,400
Goose Bay Operation	<u>61,272,750</u>
Total:	224,360,813
Less Frobisher Bay Bulk Oil	<u>9,758,400</u>
	214,602,413
	<u>OR</u> <u>107,301.2 s/tons</u>

Plans for 1966

Continued resupply in 1966 plus scientific work as required by Government departments and continuing stevedoring operations at Goose Bay, Labrador.

MARINE WORKS BRANCH

Responsibilities Establishment and maintenance of marine aids to navigation in the Athabasca-Mackenzie water route and in the Western Arctic, Hudson Strait, Hudson Bay, and Frobisher Bay areas.

Long-term Plans

Maintenance, operation, and expansion of marine aids to keep pace with expanding shipping requirements. Participation in the Inter-departmental Engineering Committee co-ordinating activities of government departments in relation to the Athabasca-Mackenzie water route.

Review of 1965 Operations

In the Athabasca-Mackenzie waterway aids to navigation were placed at the opening of the season, and regular frequent patrols were made to ensure that they were functioning as intended.

The number of aids of all types in use in the area increased by 186 to a total of 1496. Nineteen sets of ranges were equipped with lights.

In the Hudson Bay and Hudson Strait area new navigational aids were established at Bear Isl. and, Charles Isl. and Ashe Inlet. All existing lights and radio beacons were maintained in operation in these areas. The marine responder radio beacons established last year were modified to eliminate the responder section of the beacon and the beacons were operated continuously during the 1965 season. The serviceability factor of these units was very low and Telecommunications Branch is taking steps to improve their performance.

Plans for 1966

All navigational aids will be in operation for the 1966 shipping season and improvements and additional aids will be installed as required.

In the Athabasca-Mackenzie area aids are being continually improved and it is expected to install 8 - 10 new towers and lights during the next season, as well as new buoys. The Marine Agency at Fort Smith is being relocated to Hay River at a cost of \$160,000 and \$125,000 will be spent for new aids in this Agency. The operation budget at this Agency for aids will be \$57,000.00.

UNEMPLOYMENT INSURANCE COMMISSION

Responsibilities Administration of the Unemployment Insurance Act (excluding the operation of the National Employment Service) through the Commission's local office at Whitehorse, Yukon Territory.

Long-term Plans

Study of the problems of applying unemployment insurance in a satisfactory manner to workers in remote areas.

Review of 1965 Operations

The Whitehorse office handled 1,805 claims for unemployment insurance benefits and disbursed a total of \$251,000. This included claims handled by agents acting on behalf of the Commission at Dawson (59 claims). In the Northwest Territories agents operated at Hay River (55 claims) and at Inuvik (1 claim).

Plans for 1966

The continued normal operation of the Unemployment Insurance Service already in existence.

TREASURY OFFICE

NORTHERN AFFAIRS AND NATIONAL RESOURCES

Revenue and Expenditures in the Northwest Territories

and the Yukon Territory

Fiscal Year 1964-65

<u>Department</u>	<u>Northwest Territories</u>		<u>Yukon Territory</u>	
	<u>Revenue</u>	<u>Expenditures</u>	<u>Revenue</u>	<u>Expenditures</u>
Agriculture	3,494.01	72,345.96	6,873.17	148,583.24
Chief Electoral Officer	800.00	11,517.00	400.00	26,864.00
Citizenship and Immigration		956.00	4.00	11,090.71
Defence Production				1,518.89
External Affairs				147.49
Indian Affairs		817,448.99		1,029,474.43
Finance		5,932,061.31		2,249,263.77
Fisheries	6,101.00	168,555.00	11,288.00	23,278.00
Justice	24,282.08	182,825.67	67,677.28	203,113.56
Labour		89,629.67		194,254.67
Mines and Technical Surveys	666.98	645,239.89	2,452.60	505,257.10
National Defence		1,557,984.00		2,005,147.00

<u>Department</u>	<u>Northwest Territories</u>		<u>Yukon Territory</u>	
	<u>Revenue</u>	<u>Expenditures</u>	<u>Revenue</u>	<u>Expenditures</u>
National Health and Welfare	528,235.23	5,858,523.98	801,232.75	2,360,795.56
National Revenue			2,427,029.00	218,389.55
Northern Affairs and National Resources	3,228,909.04	21,130,182.27	567,902.20	5,897,762.96
Northern Canada Power Commission	3,551,649.00	9,146,047.00	998,187.00	248,075.00
Post Office	139,774.61	1,012,598.84	159,737.82	927,533.28
Public Works	127,782.00	10,546,866.00	482,006.00	90,377.00
Royal Canadian Mounted Police	540,714.75	1,615,165.72	314,148.82	766,359.89
Veterans Affairs		7,890.00		4,340.00
Trade and Commerce	1,248.70	876.21	2,284.05	2,803.15
Transport	755,556.23	8,240,509.49	116,446.34	2,616,588.84
Unemployment Insurance Commission				49,934.09
	<u>\$8,909,213.63</u>	<u>\$67,037,223.00</u>	<u>\$5,957,669.03</u>	<u>\$19,580,952.18</u>

APPENDIX "B"

GOVERNMENT EMPLOYEES IN THE NORTHWEST TERRITORIES

DEPARTMENT OR AGENCY	NUMBER OF EMPLOYEES			
	Full Time	Seas- onal	Part Time	Total
Agriculture	17	6	9	32
Canadian Broadcasting	30	-	10	40
<u>Citizenship & Immigration</u>				
Immigration	1	-	-	1
Indian Affairs	63	-	-	63
Total	64	-	-	64
Crown Assets Disp. Corp.	-	-	3	3
Eldorado Mining	-	1	-	1
<u>Fisheries</u>				
Conservation, Development & Inspection Services	14	7	2	23
Fisheries Research Board	2	26	12	40
Total	16	33	14	63
<u>Forestry</u>				
Dept. of Forestry Ottawa Office	-	-	1	1*
Alberta-N.W. and Y.T. Regional Office	-	-	4	4*
Total	-	-	5	5
<u>Justice</u>				
Territorial Court Whitehorse, Y.T.	11	-	-	11
Territorial Court Yellowknife, N.W.T.	7	-	-	7
Total	18	-	-	18
<u>Mines and Technical Surveys</u>				
Geographical Surveys	9	17	-	26
Geological Survey	4	95	1	100
Marine Sciences	-	47	-	47
Observatories Branch	9	11	5	25
Polar Continental Shelf Project	-	52	70	122
Surveys and Mapping Branch	-	70	33	103
Total	22	292	109	423
<u>National Defence</u>				
National Canadian Armed Forces	730	88	-	818
Defence Research Board	1	-	-	1
Total	731	88	-	819
National Health and Welfare	310	5	4	319
<u>National Museum of Canada</u>				
Human History Branch	-	7	-	7
Natural History Branch	6	3	2	11
Total	6	10	2	18

AND THE YUKON TERRITORY

LOCATION OF FULL-TIME EMPLOYEES

Q. E. Isl.	Northwest Territories		Mack- enzie	Yukon	TOTAL	REMARKS
	Rest of Frankl.	Kee- watin				
-	-	-	6	11	17	
-	6	-	14	10	30	
-	-	-	-	1	1	
-	-	-	24	39	63	
-	-	-	24	40	64	
-	-	-	-	-	-	
-	-	-	-	-	-	
-	-	-	14	-	14	
-	-	-	2	-	2	
-	-	-	16	-	16	
-	-	-	-	-	-	*Employed in the Mackenzie District
-	-	-	-	-	-	
-	-	-	-	-	-	
-	-	-	-	11	11	
-	-	-	7	-	7	
-	-	-	7	11	18	
-	8	-	1	-	9	
-	-	-	2	2	4	
-	-	-	-	-	-	
4	-	2	3	-	9	
-	-	-	-	-	-	
-	-	-	-	-	-	
4	8	2	6	2	22	
180	30	-	144	376	730	
1	-	-	-	-	1	
181	30	-	144	376	731	
-	6	62	105	137	310	
-	-	-	-	-	-	
1	-	-	3	2	6	
1	-	-	3	2	6	

NUMBER OF EMPLOYEES

DEPARTMENT

OR

AGENCY

Full
Time

Seas-
onal

Part
Time

Total

National Research Council

Building Research	-	-	5	5
Mechanical Engineering	-	-	7	7
Pure Physics	1	-	-	1
Space Research Facilities Branch	<u>18</u>	<u>-</u>	<u>-</u>	<u>18</u>
Total	19	-	12	31

National Revenue

Customs and Excise	15	1	1	17
Taxation	<u>8</u>	<u>-</u>	<u>-</u>	<u>8</u>
Total	23	1	1	25

Department of Northern Affairs
and National Resources

Canadian Wildlife Service	4	12	20	36
Council of the Northwest Territories	29	-	-	29
Council of the Yukon Territory	39	13	-	52

Natural & Historic Resources Branch

National Parks Service	2	-	-	2
Historic Sites Division	-	-	-	-

Northern Administration Branch

Administrator of the Arctic	312	14	-	326
Administrator of the Mackenzie	675	55	200*	930

Nothern Canada Power Commission	139	33	120	292
Nothern Co-ordination and Research Centre	5	2	17	24

Resource Management Division	<u>20</u>	<u>-</u>	<u>1</u>	<u>21</u>
Total	1225	129	358	1712

Northern Transportation Company	4	366	364	734
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Post Office	76	-	10	86
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Public Works	581	678*	75	1334
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R.C.M.P.	178	-	-	178
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Transport

Air Services	531	117	192	840
Marine Services	<u>-</u>	<u>831</u>	<u>388</u>	<u>1219</u>
Total	531	948	580	2059

Unemployment Insurance Commission	3	-	-	3
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Grand Total, 1965	<u>3854</u>	<u>2557</u>	<u>1556</u>	<u>7967</u>
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Grand Total, 1964	<u>3485</u>	<u>3228</u>	<u>733</u>	<u>7446</u>
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Difference	+369	-671	+823	+521
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LOCATION OF FULL-TIME EMPLOYEES

Q.E. Isl.	<u>Northwest Territories</u>			Yukon	TOTAL	REMARKS
	Rest of Frankl.	Kee- watin	enzie			
-	-	-	-	-	-	
-	-	-	-	-	-	
1	-	-	-	-	1	Cosmic Ray
-	-	18	-	-	18	Station Resolute
1	-	18	-	-	19	Bay Churchill
-	-	-	-	15	15	
-	-	-	-	8	8	
-	-	-	-	23	23	
-	-	-	3	1	4	
-	1	-	28	-	29	
-	-	-	-	39	39*	Plus 635
-	-	-	2	-	2	Territorial govern-
-	-	-	-	-	-	ment Employees
2	175	135	-	-	312	
-	36	-	639	-	675*	Includes all
-	21	-	104	14	139	vacant positions on
-	-	-	5	-	5	establishments
-	-	-	7	13	20	
2	233	135	788	67	1225	
-	-	-	4	-	4	
-	3	5	30	38	76	
-	-	-	28	553	581*	Includes Churchill,
4	29	13	77	55	178	Man.
64	137	66	154	110	531	
-	-	-	-	-	-	
64	137	66	154	110	531	
-	-	-	-	3	3	
257	452	303	1413	1438	3854	
201	476	260	1248	1300	3485	
+56	-24	+43	+165	+138	+369	

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